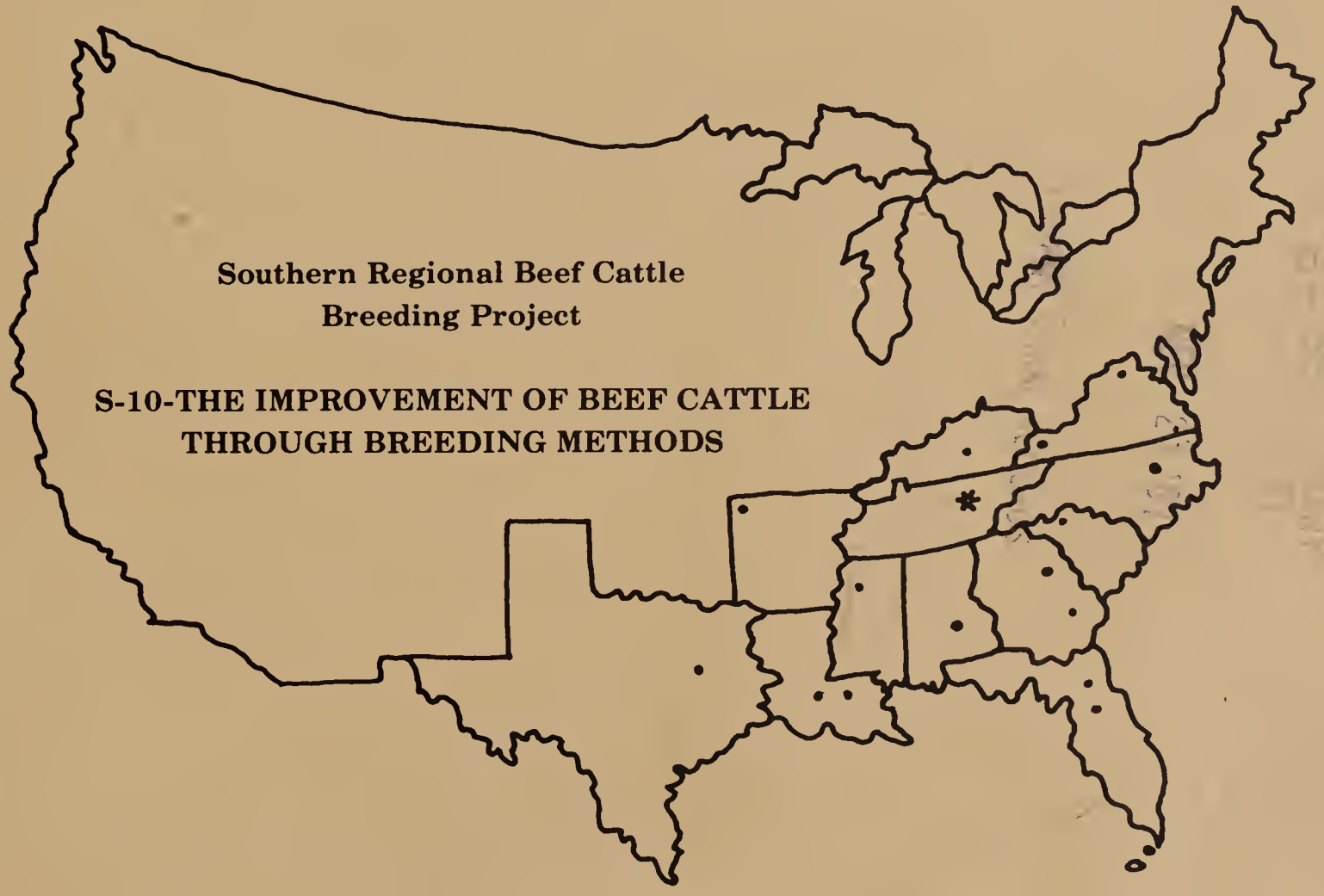
UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
ANIMAL SCIENCE RESEARCH DIVISION
and
COOPERATING SOUTHERN STATES

1974 Annual Report of S-10
and
Report of Annual Technical Committee Meeting
Coastal Plain Station, Tifton, Georgia
June 2-5, 1974



This report is intended for the use of administrative leaders and workers and is not for general publication.

S - 1 0 - 1 9 7 4 ANNUAL REPORT

I N T R O D U C T I O N

This project was initiated in 1948 to investigate and develop methods of breeding more productive beef cattle for the South. Detailed annual reports showing research developments and progress in each state have been prepared each year since 1950. Complete results of certain phases of the project have been reported in regional bulletins and technical articles and bulletins published by workers in the various states which contribute to the S-10 project.

This publication includes the proceedings of the 1974 annual meeting of the S-10 Technical Committee and the annual reports of projects in each of the twelve contributing states. The annual reports of S-10 contributing and supporting projects were prepared by the project leaders and other personnel at the various stations as summaries of the research developments and progress at each station during 1974. The results are not considered final, but the materials aid cooperators in developing an integrated program. This report also provides information needed by heads of animal science departments, experiment station directors, and U. S. Department of Agriculture officials for evaluation of the projects with respect to objectives and procedures. <u>This report is not for general distribution and material contained in it should not be quoted in publications</u>.

ANNUAL MEETING
S-10 TECHNICAL COMMITTEE

Coastal Plain Station
Tifton, Georgia
June 2-5, 1974

Itinerary and Program

Sunday - June 2	-	Assemble in Tifton
Monday - June 3	-	Assemble at Rural Development Center, Room 1
8:30 - 8:40 a.m.		Welcome - Dr. E. Broadus Browne, Resident Director of Coastal Plain Station and Associate Director of Agricultural Experiment Stations, University of Georgia College of Agriculture, Tifton
8:40 - 9:00 a.m.		Animal Science Division and Georgia's Livestock Industry - Dr. Louis J. Boyd, Chairman, Animal Science Division, University of Georgia College of Agriculture, Athens
9:00 - 9:45 a.m.		Techniques Involved in Breeding Superior Forages - Dr. Glenn W. Burton, Research Geneticist, USDA, ARS, Tifton
9:40 - 10:00 a.m.		Discussion
10:00 - 10:15 a.m.		Recess
10:15 - 11:00 a.m.		Forages for the Future - Dr. Glenn W. Burton
11:00 - 11:45 a.m.		S-10 - Project Revision - Dr. W. T. Butts, Investigations Leader
11:45 - 2:00 p.m.		Lunch and travel to R. W. Jones Farm, Leslie
2:00 - 3:00 p.m.		Visit R. W. Jones Farm - Mrs. R. W. Jones, Jr. and Mr. Vicktor Jones
3:00 - 4:00 p.m.		Travel to Graham Angus Farm, Albany
4:00 - 5:30 p.m.		Visit Graham Angus Farm - Mr. Bill Graham
5:30 -		Return to Tifton
		Evening Free

Tuesday - June 4 - Assemble at Rural Development Center, Room 1

8:00	- 12:00 Noon	State Reports -
		8:00 Mississippi
		8:30 North Carolina
		9:00 South Carolina
		9:30 Tennessee
		10:00 Recess
		10:15 Texas
		10:45 Virginia
		11:15 Front Royal
		11:45 Investigations Leader
12:00	- 1:00 p.m.	Lunch
1:00	- 3:00 p.m.	Tour Grass Breeding and Animal Science Departments, Coastal Plain Station, Tifton
3:00	- 3:30 p.m.	Leave and travel to Coastal Plain Station's Alapaha Unit
3:30	- 4:30 p.m.	Tour Cattle and Pasture Program, Alapaha Unit, Alapaha
4:30	- 5:00 p.m.	Return to Tifton
		No formal program scheduled for evening.

Wednesday - June 5 - Assemble at Rural Development Center, Room 1

8:00	- 8:30 a.m.	Report - Investigations Leader
8:30	- 9:00 a.m.	Report - CSRS
9:00	- 9:30 a.m.	Report - Administrative Advisor
9:30	- 10:00 a.m.	Business Session
	11:00 a.m.	Adjourn

MINUTES OF S-10 TECHNICAL COMMITTEE MEETING

Coastal Plain Station
Tifton, Georgia

June 2-5, 1974

The Annual Meeting of the S-10 Technical Committee was called to order by Chairman C. J. Brown at 8:30 a.m. on June 3rd in Room 1 of the Rural Development Center at the Coastal Plain Station, Tifton, Georgia. The following Technical Committee members or their representatives were present:

Alabama - Troy B. Patterson, Auburn University, Auburn
Arkansas - C. J. Brown, University of Arkansas, Fayetteville
Florida - Marvin Koger, University of Florida, Gainesville
Georgia - W. C. McCormick, Georgia Coastal Plain Experiment Station, Tifton
Kentucky - F. A. Thrift, University of Kentucky, Lexington
Louisiana - Andrew C. Boston, Louisiana State University, Baton Rouge
Mississippi - Hollis D. Chapman, Mississippi State University, Starkville
North Carolina - Emmett U. Dillard, North Carolina State University, Raleigh
South Carolina - James Riley Hill, Jr., Clemson University, Clemson
Tennessee - Robert R. Shrode, University of Tennessee, Knoxville
Texas - Charles R. Long, Texas A & M University, College Station
Virginia - James R. Gaines, Virginia Polytechnic Institute and State University, Blacksburg
Administrative Advisor - Doyle Chambers, Louisiana State University, Baton Rouge
Investigations Leader - Will T. Butts, ARS-USDA, University of Tennessee, Knoxville
CSRS Representative - Estel H. Cobb, Washington, D. C.

Also in attendance were:

Louis J. Boyd, University of Georgia, Athens
W. C. Burns, Brooksville Beef Cattle Research Station, Brooksville, Florida
Joe Crockett, University of Florida, Belle Glade
Larry V. Cundiff, U. S. Meat Animal Research Center, USDA, Clay Center, Nebraska
Tom DeRouen, Iberia Station, Jeanerette, Louisiana
Larry Grime, University of Georgia, Athens
Joseph C. Johnson, Jr., Georgia Coastal Plain Experiment Station, Tifton
R. S. Lowrey, University of Georgia, Athens
J. B. McLaren, University of Tennessee, Knoxville

Ronald E. Morrow, University of Tennessee, Knoxville
W. E. Neville, Georgia Coastal Plain Experiment Station, Tifton
F. M. Peacock, Ona, Florida
Robert D. Scarth, University of Georgia, Athens
B. L. Southwell, (retired), Georgia Coastal Plain Experiment Station, Tifton
Richard C. Thomas, Texas Agricultural Experiment Station, McGregor
Carl E. Thompson, Clemson University, Clemson
Tom Turner, University of Tennessee, Knoxville
Phil Utley, Georgia Coastal Plain Experiment Station, Tifton
Ruel Wilson, ARS, Athens

Chairman Brown called on Dr. W. C. McCormick, Technical Committeeman from Georgia, to introduce Dr. E. Broadus Browne, Resident Director of the Coastal Plain Station and Associate Director of Agricultural Experiment Stations, University of Georgia College of Agriculture, Tifton, who extended a cordial welcome to the group and gave a brief description of the agricultural industry in the Coastal Plains area of Georgia and explained how the Coastal Plain Station is organized to serve this industry.

Dr. McCormick then introduced Dr. Louis J. Boyd, Chairman, Animal Science Division, University of Georgia College of Agriculture, Athens, who further elaborated on the organization of the Georgia Experiment Station system and discussed the agricultural industry in the state and the future of the live-stock industry in Georgia.

Dr. Glenn W. Burton, Research Geneticist, USDA, ARS, who is located at the Coastal Plain Station, gave a very informative and stimulating discussion on techniques involved in breeding superior forages.

Investigations Leader Dr. Will T. Butts discussed the need for a revision of the S-10 Project. A five-year review must be made during the next year and be in final form by July 1976. In order to meet this deadline, the review must be ready to go to the Director's Meeting in September of 1975. The last major review was made about 5 years ago. Dr. C. J. Brown commented that some states have moved away from their project statements and that these need to be revised. Dr. Butts suggested that a committee evaluate the situation and decide what must be done. He emphasized that a very tight, well-written write-up should go to the directors.

Each state was asked to make a brief statement concerning their present situation and projected relationship with S-10. A summary of each of these informal reports follows:

Alabama - The present environmental interaction project is being drawn to a close. The project will then be moved to a new location. New projects will be proposed within the next two years. Results from the environmental interaction project will be used to develop new projects. One area of interest is the relationship of growth curves to different environments.

Arkansas - The plans are to continue under the present project but to update and incorporate some of our crossbreeding work.

Florida - (Brooksville) The GEI project will be terminated this year. The Hereford herd will be kept for three years and used on management studies. Land development is proceeding in preparation for cooperative work with Clay Center. The first calves for this work will arrive in the fall of 1975.

Florida - A number of the Florida projects will end next year, and new projects will be implemented. New areas of research will be included in the new projects. One project will be to study dairy-beef crosses under different management systems.

Georgia - The present project is being revised. Dr. Walter Neville has been transferred to Tifton, and emphasis will be changed from crossbreeding and selection studies to research in the area of reproductive physiology. Factors such as early weaning and the relationship of pelvic measurements to reproduction will be studied

Kentucky - No animal breeding projects are planned. Most of the animals used on the S-10 project are being sold, others are being used for management studies. The present S-10 contributing project has not been terminated as of this date.

Louisiana - The present contributing project will stay the same for the next five to ten years. Other breeding projects not contributing to S-10 are under way, and others will be added as needed.

Louisiana - (Jeanerette) The research is changing directions. The fat selection study is being discontinued; however, the Brangus breed is still being evaluated. A new project studying season of calving using Angus, Brangus and F_1 is being initiated. The economic aspects will be investigated and various forage systems studied.

Mississippi - Plans are being made to have a new contributing project in the near future.

North Carolina - Plans are to continue the selection project for two more generations. The crossbreeding project will continue but is supported by state funds only.

South Carolina - The old S-10 contributing project has been closed-out and a new project proposed. This project will be presented later in the meeting. The new project will be to investigate the response of different biological types of cattle to various management regimes.

Tennessee - The present selection project will be continued as well as the cow size project. Maximum utilization of forage will be emphasized.

Texas - A new crossbreeding project is now underway and will be continued as well as the cytogenetic studies.

Virginia - No major changes are planned. The crossbreeding project will continue for about four more years.

At the conclusion of the morning program, Chairman Brown appointed Drs. Marvin Koger, Fred A. Thrift and Hollis D. Chapman (Chairman) to serve as members of the Resolution Committee, and Dr. W. C. McCormick made some announcements regarding the afternoon tour.

On the afternoon of June 3rd, the group toured the R. W. Jones Farm, Leslie, Georgia and the Graham Angus Farm, Albany, Georgia. Details are described in the program.

At 8:00 a.m. on June 4th, the group reassembled in the Rural Development Center. Chairman Brown announced that the present S-10 project started in 1966 was reviewed in 1970 and extended to June 1976. Also, the following timetable was set up:

1. Each state needs to get a project statement in by early fall. Any change needs to be in the hands of the Executive Committee by September 1, 1974.

2. The project will be rewritten during the spring of 1975, and will be ready to submit to the Administrative Advisor by July of 1975.

3. The revision will be presented to the Committee of Nine in November.

4. Each state will need a progress report of past work by January of 1975.

The morning program continued with the following states giving state reports: Mississippi, North Carolina, South Carolina, Tennessee, Texas and Virginia. Dr. James R. Gaines reported that the Front Royal Station has been turned over to the Smithsonian Institution to be used for endangered species. Dr. L. V. Cundiff gave a very short summary of the Clay Center research, and Dr. W. T. Butts gave the Investigation Leader's report for S-10.

The afternoon program consisted of a tour of the Grass Breeding and Animal Science facilities at the Coastal Plain Station and the Alapha Unit.

Following the tour, the group enjoyed a steak supper at the recreation area on the Coastal Plain Station.

The group reassembled on June 5th in the Rural Development Center, and Chairman C. J. Brown called the business meeting to order at 8:10 a.m. The minutes of the 1973 meetings were approved as printed in the 1972-73 S-10 report. Dr. Andrew C. Boston was elected as the new member of the Executive Committee. Thus, the Executive Committee for the coming year will be:

James Riley Hill, Jr. - Chairman
Hollis D. Chapman - Secretary
Andrew C. Boston - Member

Chairman Brown then recognized Dr. Estel H. Cobb, representing CSRS, who reported that CSRS is undergoing some changes and that he has new responsibilities to manage the total regional livestock research, not just beef cattle research. He stated that the Experiment Station Directors are doing a good job of building support for research, and that new funds may be added as a result of this action. He announced that he and Dr. E. J. Warwick are working on a paper dealing with genetic variation in nutrient requirements of beef cattle and they need any reports that deal with this area. Dr. Cobb emphasized that in developing a new project, the Technical Committee should not be bound by procedures when preparing the first draft.

Dr. Doyle Chambers, Administrative Advisor of S-10, reported that the Hatch Act contains a section which states that up to 25% of the funds may be used for regional research projects. Only a small portion of the funds are available to the states. He stressed the need for support of research from farmer organizations at national levels. The National Industry State Agriculture Research Council has asked for $90 million or doubling of Hatch funds. The plans are to request this in increments over the next three years. He also told the group that the American Farm Bureau was asked to rate all Federal Projects, and they rated Agriculture Research first. He emphasized the need for the upcoming review of S-10.

Dr. E. W. Dillard moved that the S-10 Technical Committee accept the invitation to hold the 1975 Annual Meeting in South Carolina. The motion was seconded by Dr. Chapman. The motion passed by voice vote.

Dr. T. B. Patterson asked if the group could meet in Alabama in 1976. Chairman Brown suggested that this be recorded for information in the minutes, but no formal action was taken.

Dr. A. C. Boston suggested that the meetings be held at least one week later next year and that the exact date be scheduled as soon as possible. Dr. L. V. Cundiff announced that NC-1 will meet at Michigan State University on July 23-24, 1974. Dr. C. J. Brown reported that there were only a small number of Breeding and Genetics papers at the Southern Section of American Society of Animal Science and urged more participation in this section. Dr. Shrode stated that the teaching section needed more papers dealing with methods of teaching Breeding and Genetics.

The resolutions were presented by Dr. Chapman. They were approved as read. A copy of this report is attached.

The motion was made and seconded that the meeting be adjourned. The motion carried.

Respectfully submitted,

James Riley Hill, Jr.
Secretary

RESOLUTIONS PRESENTED AT THE 1974 S-10 MEETING

Whereas the 1974 S-10 meeting was exceptionally enjoyable and informative, we resolve to express our sincere gratitude - by means of letters from the Chairman of the Executive Committee to:

1. Dr. W. C. McCormick and the staff of the Animal Science Department, Coastal Plain Experiment Station, Tifton, GA for planning the event.

2. Dr. E. B. Brown, Director of the station, for hosting the event.

3. Dr. G. W. Burton, main speaker at the event, for sharing with our group his unusual and exceptional knowledge of gross breeding.

4. Mrs. R. W. Jones and Mr. Victor Jones for allowing the group to visit their internationally recognized Polled Hereford farm and for discussing with our group their experiences in Animal breeding.

5. To Mr. Bill Graham for the reception and tour at Graham Angus Farm and for his candid discussion of factors important to him in directing his animal breeding and production operation.

Hollis D. Chapman, Chairman
Fred Thrift, Member
Marvin Koger, Member

ANNUAL REPORT OF COOPERATIVE REGIONAL PROJECT
January 1 to December 31, 1974

1. PROJECT: S-10 Improvement of Beef Cattle Through Breeding Methods

2. COOPERATING AGENCIES AND PRINCIPAL LEADERS:

Cooperating State Experiment Stations and Technical Committee:

Alabama	T. B. Patterson
Arkansas	C. J. Brown
Florida	Marvin Koger
Georgia	W. C. McCormick
Kentucky	Fred Thrift
Louisiana	Andrew C. Boston
Mississippi	Hollis Chapman
North Carolina	E. U. Dillard
South Carolina	James R. Hill, Jr.
Tennessee	R. R. Shrode
Texas	T. C. Cartwright
Virginia	J. A. Gaines

U. S. Department of Agriculture Agencies and Leaders:
W. T. Butts, Research Leader, S-10, ARS, Knoxville, Tennessee
W. C. Burns, Superintendent, Brooksville Beef Cattle Research Station, Brooksville, Florida
E. H. Cobb, Cooperative State Research Service, Washington, D. C.

Regional Officers, 1973-1974:
Doyle Chambers, Administrative Advisor, Baton Rouge, Louisiana
C. J. Brown, Chairman, Fayetteville, Arkansas
James R. Hill, Jr., Secretary, Clemson, South Carolina
Hollis Chapman, Executive Committee Member, Mississippi State, Mississippi

3. PROGRESS OF THE WORK AND PRINCIPAL ACCOMPLISHMENTS:

Five journal articles, two state experiment station bulletins and sixty-one abstracts, theses and miscellaneous publications were reported from work associated with the regional project.

New projects were developed in South Carolina and at the Brooksville, Florida station. The South Carolina study will compare cows of different breed combinations maintained at two locations under two levels of nutrition and management. The Brooksville study will investigate the effect of supplemental energy on performance of lines of Hereford cattle exhibiting a genotype x environment interaction between that station and Miles City, Montana. Substantial planning toward a new program of beef cattle research was accomplished at the Mississippi station.

Seven states reported results from crossbreeding studies involving Hereford, Angus, Shorthorn, Santa Gertrudis, Charolais, Brahman, Holstein, Brown Swiss and Jersey breeds in various combinations. Louisiana reported results from extensive analyses of accumulated data from comparisons of Angus, Brahman, Charolais and Hereford and crosses among these breeds. All crossbred cows were Brahman crosses. Calf crop weaned by crossbred dams raising backcross or 3-breed cross calves was 84 percent compared with 66 percent for dams raising straightbred calves. Differences among the breeds, bred straight, were not significant. However, Hereford-Brahman dams weaned an 89 percent calf crop compared with a mean of 79 percent for Angus-Brahman and Charolais-Brahman females. Hereford and Angus bulls sired an 86 percent calf crop versus 80 percent for Charolais bulls. Weaning weights of 455,514 and 528 pounds were reported for straightbreds, backcrosses and 3-breed crosses, respectively. Birth weights were similar for the three mating systems. Combining reproductive performance and cow weight with calf weaning weight provided estimates of 29, 39 and 43 pounds of calf weaned per 100 pounds of cow exposed for straightbreds, backcrosses and 3-breed crosses, respectively. Using this measure of performance, Hereford-Brahman cows were 2 pounds greater than Angus-Brahman and 6 pounds greater than Charolais-Brahman dams. Hereford-Brahman cows out of Hereford and Angus dams were superior to the reciprocals. Postweaning rate of gain was greater (0.1# per day) for 3-breed cross steers than for backcross or straightbred calves. Virginia reported results from the sixth through the twelfth calf crops of cows from Phase II of their long-term crossbreeding study. Straightbred Hereford, Angus and Shorthorns were compared with 2-breed cross cows raising 3-breed cross calves. Large differences in favor of the crossbreds were observed in birth, weaning, slaughter and carcass weights. No differences were observed in feeder grade, slaughter grade or carcass grade. Thirty-three straightbred and 43 crossbred cows remained in 1974 out of original herds of 60 cows each. Three hundred twelve straightbred matings weaned 261 calves (83.7%), whereas 347 crossbred matings weaned 324 calves (93.4%). Increase in total yield at weaning was approximately 24 percent for the crossbred system. Texas reported average heterosis for crosses among Angus, Brahman, Hereford, Holstein and Jersey of 7 percent for ADG to a year of age, 9 percent for 365 day weight, 2 percent for 365 day height and 0 for gain in height. Brahmans and Holsteins were taller at a year of age and Angus and Holsteins heavier among the straightbreds. Crossbred bulls were larger and younger at puberty than were straightbreds. Tifton, Georgia compared straightbred grade herds of Angus, Polled Hereford and Santa Gertrudis with 2-breed crisscross and 3-breed rotational cross systems. Preweaning ADG's of 1.64, 1.83 and 1.85 pounds were reported for straightbreds, 2-breed crosses and 3-breed crosses, respectively. Straightbred Santa Gertrudis gained faster to weaning (2.04 lbs./day) than other groups followed by P.H. x S. G. rotational cross groups (1.94 lbs./day). Greatest apparent heterosis was in the P.H. x S.G. system. Alabama reported 24 hour, 4 percent fat corrected, milk production of 8.2, 8.8, 9.6 and 11.3 pounds for Hereford, 3/4 Hereford-1/4 Charolais, 3/4 Hereford-1/4 Brown Swiss and 3/4 Hereford-1/4 Holstein cows, respectively, raising Hereford sired calves. Weaning weights were 455, 507, 507 and 515 for the same groups. No differences in postweaning gain or carcass traits were observed. Arkansas reported significant sire breed and nonsignificant dam breed and interaction effects on carcass weight and composition of calves sired by Hereford, Angus, Charolais and Santa Gertrudis bulls and out of Hereford and Angus cows. Reflectance meter measurement of meat color indicated no differences due to sire or dam breeds

with the exception of a significant sire effect under amber filtration. Charolais had larger muscle fiber diameter in the Psoas major and Quadriceps femoris muscles. No differences were found in sarcomere length or Longisimus dorsi, Psoas major and Quadriceps femoris muscles. Florida noted difficulty in rebreeding dairy crosses nursing their first calf in State institutional herds. Data were collected in the Region, although results were not available, on almost all of the new breeds of interest to the industry. Very consistent breed combination, location and environmental effects on animal performance appear to be emerging, as results from S-10 contributing projects accumulate. Mechanisms responsible for these response patterns remain largely unknown.

An Alabama study has compared high and low genetic groups of Angus and Hereford cattle maintained under high and low nutritional regimes. Division into genetic groups was on the basis of previous performance of foundation animals. A genotype x environment interaction was found in performance of the Angus cattle. Weaning weights of 539 pounds and 508 pounds were reported for the high and low genetic groups,respectively, on the high nutritional level in comparison with weights of 448 pounds and 446 pounds, respectively, on the low nutritional regime. Performance of the two genetic groups of Herefords have not differed during this study, hence interpretation of the lack of an interaction is not possible. While not directly comparable, many similarities exist between the Angus results in this study and those previously reported from studies at Brooksville, Florida - Miles City, Montana; Jeanerette, Louisiana and Ona, Florida. Arkansas and Florida reported results from studies which are of interest in the general area of the effects of environment, adaptation and, possibly, genotype x environment interactions. Genetically similar herds of Angus cows maintained in the dissimilar environments of Northwest and Southeast Arkansas exhibited similar maturing rates but lighter mature weights (50 lbs.) at the Southeast location. Calf weaning weights were the same fraction (51%) of mature cow weight at each of the locations. The Florida Experiment Station maintains an experimental herd of grade Hereford cattle in the southern part of the state in a location considered extremely undesirable for British cattle. This herd was made up about 10 years ago of selections from a large herd which had been at the location for approximately 30 years. Intense selection for performance has been practiced in the research herd since its formation. Current weaning weights equal or exceed those at all other Florida Experiment Station locations except one.

4. USEFULNESS OF FINDINGS:

Activities of the S-10 project have allowed Technical Committeemen to have continuous current knowledge of all breeding research in the Region. This has allowed the recognition of broad response patterns which would not have been visible from the technical literature alone. Much of the current thinking concerning adaptation, genotype x environment interaction, selection goals and production efficiency are more the result of close working relationships among the members of the Regional Project over a long period of time

than of formal reporting. Hence, the body of knowledge possessed by the Committee is much greater than the sum of individual contributions. At this time, when the cattle industry appears to be entering a period of fundamental change, information from the beef breeding group will provide the basis for many of the necessary decisions.

5. WORK PLANNED:

Investigations will proceed according to project outline, revised October, 1965. Individual state contributions, revised October, 1970, contain changes authorized by the Technical Committee. The project statement will be revised in 1975 and submitted to the Southern Directors for review and extension. Particular emphasis will be placed on completion of a regional bulletin or bulletins characterizing those breeds and breed combinations for which substantial data are available in the Region. Data summarization and reporting will proceed on a number of long-term studies which have completed the data collection phases.

6. PUBLICATION:

See attached list.

7. APPROVED:

April 2-1 1975 — (Date) — Chairman, Technical Committee

Jan 24, 1975 — (Date) — Regional Administrative Advisor

STATE REPORTS

AUBURN UNIVERSITY
Agricultural Experiment Station
Auburn, Alabama

I. PROJECT: Hatch 219 (S-10)

The effect of environment, genetic-environmental interaction and heterosis on performance of beef cattle

II. OBJECTIVES:

To evaluate the effect of environment and genetic progress under phenotypic selection.

To determine the effectiveness of selection for total performance in beef cattle.

To determine the influence of heterosis on rate of gain, carcass quality and cow performance.

III. PERSONNEL:

T. B. Patterson and G. B. Meadows

IV. ACCOMPLISHMENTS DURING THE YEAR:

1. Scope and nature of work.

The combination of land area, rainfall and long growing season which results in the production of abundant forage, makes the Southeastern United States well adapted to beef production. In order to maximize these natural advantages, there is a definite need for the improvement of the mean performance of beef cattle.

The differential response in various species of animals to their climatic environment has been adequately substantiated. Most of our present breeds of livestock were developed for adaptability to certain environmental conditions as well as to perform specific functions.

Presently beef cattle are being performance tested under specific conditions, while their progeny are expected to perform under a wide range of conditions. In theory, the measurable variance of different traits is composed of variance due to genetic, environment and their interaction. Only change in the additive fraction of the genetic variance results in permanent change in response to selection. Nevertheless, the magnitude of the environmental and/or genetic-environmental

fraction can definitely influence the effectiveness of a selection program. Further, by providing the optimum environment and by taking advantage of genetic-environmental interaction, higher production levels are possible.

There is need for additional research to determine the effectiveness of selection for total performance in beef cattle. In essence, information is needed to test whether the apparently large additive genetic variance, as determined by heritability estimates, can actually be exploited in a program of mass selection.

Purebred herds of the Angus and Hereford breeds located at the Beef Cattle Research Unit, Auburn University, provided the foundation stocks for this study. Each breed was divided into high and low performance groups based initially on previous record, where available, and on a performance index otherwise. These groups were sub-divided into two equal groups on the same basis. Thus there are two high and two low performance groups for each breed. This makes a total of eight herds. One high and one low performance herd of each breed was assigned at random to a high and low nutritional regime.

Winter feeding levels are the same for all eight herds. However, the high nutritional groups are placed on the best legume pastures in the spring while the low nutritional groups remain on silage until grass pastures are available. In addition the calves in the high nutritional groups are given access to a creep feed which is relatively high in protein and low in carbohydrates. No other environmental differences are imposed on the two nutritional groups.

After weaning all cows are subjected to similar management conditions. All calves within sexes are handled alike on post-weaning test. Replacements are selected by index within the eight breed groups.

Data collected include birth weight, weaning weight, weaning score, ultrasonic fat thickness estimates, post-weaning gain (minimum of 140 days for bulls and 120 days for heifers), final score, final finish score, final ultrasonic fat thickness estimates and weight of bulls at 400±15 days.

2. Research results.

Seven calf crops have been weaned and have completed a post-weaning performance test. Data for these seven years were analyzed by the method of least squares. Separate analyses were made for Angus and Hereford and to correct for inbreeding of the calf and inbreeding of the dam.

The average inbreeding of Angus and Hereford cows and calves are shown in Table 1. Largely as a result of efforts to avoid close inbreeding when practical, inbreeding in both breeds is low. The Angus herd had some inbreeding when the experiment started and has continued at a higher level than the Hereford herd. Inbreeding of the calf had a significant effect on birth weight (BW) and adjusted weaned weight (AWW) in Angus but no effect in the Herefords, probably due to the low inbreeding level in Herefords.

There were highly significant differences in AWW, final weight per day of age (FWDA) and condition score at weaning (CSW) due to preweaning environment for both Angus and Herefords and for both sexes, Tables 2 and 3. The differences at weaning for both sexes and both breeds are much larger than usually reported in the literature.

There were significant differences ($P<0.01$) in Angus between high and low genetic herds for AWW, post-weaning average daily gain (PADG) and FWDA, Table 4. In addition there were highly significant genetic-environmental interactions for AWW and FWDA in the Angus herd. There were no differences in performance traits between high and low genetic herds in the Hereford breed, Table 5, and as expected there could not be genetic-environmental interactions.

Tables 6 and 7 show the effect of pre-weaning nutrition on subsequent reproductive performance of young females for the Angus and Hereford breeds respectively. For both breeds fewer of the low nutrition females calved at two years of age than those on high nutrition. There was a greater effect in Herefords than in Angus, part of which is probably associated with sexual maturity at the time of exposure during a 60-day breeding season. Of the heifers that weaned a calf at 2 years of age, a significantly higher percentage from high pre-weaning nutrition group weaned calves as 3 year olds than those from low pre-weaning nutrition group. These differences in percentage of cows calving and weaning a calf were approximately the same for the two breeds. However, the Angus cows calved and weaned a significantly higher percentage of calves than the Herefords. Though the numbers were small, there were no differences between nutrition groups or breeds for percentage of calves born and weaned for cows that did not wean a calf as a 2 year old and were exposed to calve at 3 years. Approximately 4 percent more cows on low nutrition failed to calve at 2 or 3 years when compared to high nutrition cows. It should be made clear that from weaning until their calves were born at 3 years of age all females were treated alike so that the lower reproductive performance is a result of carry over effect of their treatment prior to weaning.

V. FUTURE PLANS:

The project will continue as outlined for two more years.

VI. PUBLICATIONS DURING THE YEAR:

None

VII. PUBLICATIONS PLANNED:

Journal paper, Estimates of Genetic and Phenotypic Parameters for Pre-Weaning Traits Among Angus and Hereford Cattle.

Table 1. Average inbreeding coefficient cow and calves 1966-1972.

	Cows	Calves
Angus	0.040	0.072
Hereford	0.007	0.034

Table 2. Least-squares means[1/] for performance traits in Angus. Effect of environment. Seven years.

Sex	Heifer			Bull		
Environment	High	Low	Difference	High	Low	Difference
Number	132	146	--	144	143	--
Birth weight, lbs.	59.0	59.3	-0.3	62.9	61.9	1.0
Adj. wean wt., lbs.	480.9	426.9	54.0**	566.1	466.8	99.3**
Test ADG, lbs.	1.15	1.13	0.02	2.58	2.61	-0.03
Final WDA, lbs.	1.64	1.49	0.15**	2.38	2.15	0.23**
Final conf. score[2/]	13.0	12.5	0.5	13.4	12.9	0.5
Wean cond. score[3/]	4.1	3.1	1.0**	4.1	2.9	1.2**

1/ Adjusted for age of dam, year, genetic group and inbreeding of calf.
2/ 12 = low Choice; 13 = Choice etc.
3/ 1-3 = thin; 4-6 = average; 7-9 = fat.
**P<0.01.

Table 3. Least-squares means[1/] for performance traits in Herefords. Effect of environment. Seven years.

Sex	Heifer			Bull		
Environment	High	Low	Difference	High	Low	Difference
Number	109	118	--	129	116	--
Birth weight, lbs.	64.7	64.6	0.1	68.8	68.8	0.0
Adj. wean wt., lbs.	468.5	396.1	72.4**	527.0	433.8	93.2**
Test ADG, lbs.	0.84	0.92	-0.08	2.54	2.48	0.06
Final WDA, lbs.	1.50	1.34	0.16**	2.28	2.01	0.27**
Final conf. score[2/]	12.8	12.3	0.5	13.2	12.5	0.7
Wean. cond. score[3/]	3.7	2.8	0.9**	3.8	2.7	1.1**

[1/] Adjusted for age of dam, year, genetic group and inbreeding of calf.
[2/] 12 = low Choice; 13 = Choice etc.
[3/] 1-3 = thin; 4-6 = average; 7-9 = fat.
**P<0.01.

Table 4. Least-squares means[1/] for performance traits in Angus. Effect of genetic groups. Seven years.

Sex	Heifer			Bull		
Genetic group	High	Low	Difference	High	Low	Difference
Number	150	128	--	143	144	--
Birth weight, lbs.	60.7	57.7	1.0	64.1	60.7	3.4
Adj. wean wt., lbs.	465.0	442.8	22.2**	522.0	510.9	11.1**
Test ADG, lbs.	1.20	1.08	0.12**	2.66	2.53	0.13**
Final WDA, lbs.	1.61	1.52	0.09**	2.30	2.23	0.07**
Final conf. score[2/]	13.0	12.6	0.4	13.2	13.2	0.0
Wean cond. score[3/]	3.6	3.6	0.0	3.5	3.5	0.0

[1/] Adjusted for age of dam, year, environmental and inbreeding of calf.
[2/] 12 = low Choice; 13 = Choice; 14 = high Choice etc.
[3/] 1-3 = thin; 4-6 = average; 7-9 = fat.
** P<0.01.

Table 5. Least-squares means[1/] for performance traits in Herefords. Effect of genetic groups. Seven years.

Sex	Heifer			Bull		
Genetic group	High	Low	Difference	High	Low	Difference
Number	115	112	--	126	119	--
Birth weight, lbs.	65.3	64.0	1.3	69.0	68.6	0.4
Adj. wean. wt., lbs.	434.4	430.1	4.3	483.5	477.3	6.2
Test ADG, lbs.	0.86	0.90	-0.04	2.50	2.51	-0.01
Final WDA, lbs.	1.42	1.43	-0.01	2.16	2.14	0.02
Final conf. score[2/]	12.4	12.6	-0.2	12.9	12.9	0.0
Wean. cond. score[3/]	3.4	3.2	0.2	3.2	3.2	0.0

[1/] Adjusted for age of dam, year, environmental and inbreeding of calf.
[2/] 12 = low Choice; 13 = Choice; 14 = high Choice etc.
[3/] 1-3 = thin; 4-6 = average; 7-9 = fat.
** P<0.01.

Table 6. The effect of high and low pre-weaning nutrition level on the reproductive performance of young Angus females when exposed to calve first at two years of age. Six year average[1/].

Nutrition level	High	Low	Difference
Number exposed at 2 years	82	89	--
Percent calving	79.3	73.0	6.3
Percent weaned	69.5	64.0	5.5
Percent death loss	12.3	12.3	0.0
Number exposed at 3 years that weaned calf at 2 years	44	49	--
Percent calving	88.6	75.5	13.1
Percent weaned	86.4	71.4	15.0
Number exposed at 3 years that did not wean calf at 2 years	22	26	--
Percent calving	90.9	88.5	2.4
Percent weaned	86.4	73.1	13.3
Percent no calf as 2 or 3 years	3.7	8.1	4.4

1/ Five years for 3 year olds.

Table 7. The effect of high and low pre-weaning nutrition level on the reproductive performance of young Hereford females when exposed to calve first at two years of age. Six year average[1/].

Nutrition level	High	Low	Difference
Number exposed at 2 years	69	70	--
Percent calving	78.3	55.7	22.6
Percent weaned	69.6	47.1	22.5
Percent death loss	11.1	15.4	-4.3
Number of exposed at 3 years that weaned calf at 2 years	43	27	--
Percent calving	76.7	63.0	13.7
Percent weaned	67.4	55.6	11.8
Number exposed at 3 years that did not wean calf at 2 years	18	31	--
Percent calving	83.3	83.9	-0.6
Percent weaned	72.2	74.2	-2.0
Percent no calf at 2 or 3 years	7.2	11.4	4.2

1/ Five years for 3 year olds.

I. PROJECT: Animal Science 4-017

The effects of breed and breed crosses on milk production and on other production factors in a grade beef herd

II. OBJECTIVES:

To determine the effect of Brown Swiss, Holstein and Charolais breeding on (a) milk production, (b) weaning weights and grades, (c) feedlot performance, and (d) carcass desirability.

III. PERSONNEL:

T. B. Patterson and R. A. Moore

IV. ACCOMPLISHMENTS DURING THE YEAR:

1. Scope and nature of work.

Many of the commercial beef herds in the Southeast were established with common cows of predominately dairy breeding as foundation females. Purebred beef bulls were used in a grading up process. Most of the build up in numbers and subsequent grading up process occurred within the past 15-20 years when market price and demand favored a so called "milk fat calf". Consumer preference has changed over the past five to ten years to a demand for heavier beef. Nevertheless, most commercial producers in Alabama still market their calves at weaning, and total weight and price per cwt. determine gross receipts.

In the opinion of many commercial breeders there is an apparent reduction of milking abilities of brood cows associated with the grading up process. Milk is the most important source of quality nutrients in the diet of the beef calf. Producers are faced with the choice of reverting to the original type cows that are often lacking in beef conformation and/or inherent ability to gain, or attempting to improve milk production within the existing herd through phenotypic selection. Obviously, improvement in milk production can be accomplished most rapidly through the use of selected sires since a sire constitutes roughly one-half of the genetic make-up of the herd.

Seventy-five grade beef cows were divided into similar groups of 25 each on the basis of age, breeding, and previous production record each year. They were bred to Hereford (control), Brown Swiss and Charolais bulls. The bulls were changed each year. A group of Holstein and Holstein-Jersey cows were bred to the Hereford bulls.

Additional information such as milk production of the original cows at 90 and 250 days of lactation was established. Production information on all calves to weaning can be related to milk production of their dams. Post weaning performance and carcass data on all steer calves provided information on the effects of breeding on production.

All physically sound heifers produced by the procedure described above have been retained until approximately 25 breeding age females per breeding group were available. These heifers were bred to closely related Hereford bulls selected from a high producing herd. Only bulls with above average weaned weights were considered. Milk production obtained from this set of females will provide a comparison with the original and with subsequent herd milk production levels. Milk production and breed of dam is confounded; however, differences in calf weaned weights reflects these two important brood cow characteristics.

All steer calves are full fed on corn silage plus supplement until they have reached 1,000 lbs. and average in the Choice grade. Carcass data are obtained on all steers. As before, all physically sound heifers are retained as replacements for the next generation.

2. Research results.

Three sets of calves have been produced from the second generation cows, weaned and the steers finished in the feed lot, slaughtered and carcass data have been obtained. These data are summarized in Tables 1, 2, and 3.

Backcross cows weaned about 12% more calves than straight Hereford cows. Table 1. Further, calves from these backcross cows averaged 6 lbs. heavier at birth and 54 lbs. heavier at weaning than calves from Hereford cows. The higher per cent calf crop weaned combined with the heavier weaned weights resulted in approximately 100 lbs. more calf weaned per cow bred from the backcross cows as compared to the straight Hereford cows.

Other than initial and final weights, there were no differences in feed lot performance between the steers of different breeding groups, Table 2. No differences in carcass characteristics were observed, Table 3, other than hot carcass weight.

Cows with 1/4 dairy breeding gave more milk than Charolais or Hereford cows Table 4. There was a difference in milk yield between Hereford and Charolais cows in early lactation but no difference in late lactation.

V. FUTURE PLANS:

The project will continue as outlined.

VI. PUBLICATIONS DURING THE YEAR:

Patterson, T. B., J. A. McGuire and R. A. Moore. Effects of Brown Swiss, Charolais, Holstein and Hereford breeding on production in a grade beef herd. Auburn Univ. (Ala.) Agri. Exp. Sta. Bull. 461, Nov. 1974.

VII. PUBLICATIONS PLANNED:

None

Table 1. Percentage calves weaned, weaning weight, pounds of calf per cow bred, and stocker grades for calves from second generation cows. Three-year average.

	Breeding cows[1]			
	Hereford	3/4 Hereford 1/4 Charolais	3/4 Hereford 1/4 Brown Swiss	3/4 Hereford 1/4 Holstein
No. of cows bred	44	62	59	52
No. of calves weaned	33	52	50	48
Percentage weaned	75.0	83.9	84.7	92.3
Avg. adj. weaning wt., lbs.	456	506	507	518
Avg. lbs. calf/cow bred	342	425	429	478
Avg. stocker grade[2]	12.1	12.6	12.5	13.0

[1] All cows bred to Hereford bulls.
[2] 12 = low Choice; 13 = average Choice; 14 = high Choice, etc.

Table 2. Feed lot performance of steers from second generation cows. Three year average.

	Breeding steers			
	Hereford	7/8 Hereford 1/8 Charolais	7/8 Hereford 1/8 Brown Swiss	7/8 Hereford 1/8 Holstein
No. of steers	13	24	19	21
Avg. initial wt., lb.	445	512	541	554
Avg. final shrink wt., lbs.	922	993	1026	1004
Avg. ADG, lbs.	2.04	2.02	2.08	1.91
Avg. slaughter grade[1]	12.3	12.9	13.1	12.6

[1] 12 = low Choice; 13 = average Choice; 14 = high Choice, etc.

Table 3. Carcass data for steers from second generation cows. Three-year average.

	Breeding of steers			
	Hereford	7/8 Hereford Charolais	7/8 Hereford Brown Swiss	7/8 Hereford Holstein
No. of steers	13	24	19	21
Avg. hot carcass wt., lbs.	575	606	634	628
Avg. rib fat, ins.	0.44	0.45	0.45	0.45
Avg. ribeye area sq. ins.	10.1	10.7	10.7	10.6
Avg. yield grade	3.1	3.1	3.3	3.2
Avg. quality grade[1/]	12.0	12.4	12.0	12.0

1/ 12 = low Choice; 13 = average Choice; 14 = high Choice, etc.

Table 4. Milk production for second generation cows.

	Breeding of cows			
	Hereford	3/4 Hereford 1/4 Charolais	3/4 Hereford 1/4 Brown Swiss	3/4 Hereford 1/4 Holstein
No. of cows	15	18	21	16
Avg. 12 hr. 4% FCM, 90 days, lbs.	3.97	4.62	4.90	5.74
Avg. 12 hr. 4% FCM, 240 days, lbs.	4.27	4.20	4.70	5.56

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Production, Inventory and Performance Data, S-10 Herds - 1974

State Alabama

Location		Auburn	Auburn	Auburn	Auburn	
Breed of sire		Angus	Angus	Angus	Angus	
Breed of dam		Angus	Angus	Angus	Angus	
Line or group[1]		EIGI	EIGII	EIIGI	EIIGII	
Percent used in project		100	100	100	100	
Inventory as of December 31, 1974	Cows 2 years and over	32	27	29	29	
	Yearling heifers	11	7	7	7	
	Bulls and steers under 1 year	20	18	18	20	
	Heifers under 1 year	15	15	17	16	
	Bulls over 1 year	2	2	2	2	
	Steers over 1 year	0	0	0	0	
Repro. perf.	Percent pregnant[2]	97.7	92.5	84.8	90.9	
	Calf survival percent[3]	90.7	97.3	94.9	95.0	
Wean. perf.	Adj. ADG[4]	2.20	2.19	1.93	1.93	
	Ave. type sc.[5]	13.8	13.3	13.0	12.8	
Postweaning performance	No. of bulls	11	15	15	16	
	No. of heifers	19	11	11	11	
	No. of steers	3	0	1	3	
Slaughtered	No. of bulls	0	0	0	0	
	No. of heifers	0	0	0	0	
	No. of steers	3	0	0	0	

Remarks

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments. (To steer & mature dam)

[5]Suggest S-10 scoring system indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1974

State Alabama

Location		Auburn	Auburn	Auburn	Auburn	
Breed of sire		Hereford	Hereford	Hereford	Hereford	
Breed of dam		Hereford	Hereford	Hereford	Hereford	
Line or group[1]		EIGI	EIGII	EIIGI	EIIGII	
Percent used in project		100	100	100	100	
Inventory as of December 31, 1974	Cows 2 years and over	26	24	26	26	
	Yearling heifers	5	5	2	5	
	Bulls and steers under 1 year	16	14	16	4	
	Heifers under 1 year	14	13	15	25	
	Bulls over 1 year	2	2	2	2	
	Steers over 1 year	0	0	0	0	
Repro. perf.	Percent pregnant[2]	85.4	84.2	94.1	82.8	
	Calf survival percent[3]	94.3	81.2	96.9	100.0	
Wean. perf.	Adj. ADG[4]	1.90	1.99	1.55	1.50	
	Ave. type sc.[5]	12.9	13.4	12.5	12.6	
Postweaning performance	No. of bulls	11	12	10	9	
	No. of heifers	9	12	5	11	
	No. of steers	2	3	0	1	
Slaughtered	No. of bulls	0	0	0	0	
	No. of heifers	0	0	0	0	
	No. of steers	2	3	0	1	

Remarks

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments: (To steer & mature dam)

[5]Suggest S-10 scoring system: indicate if different.

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Production, Inventory and Performance Data, S-10 Herds - 1974

State Alabama

Location		UCPSS Winfield	UCPSS Winfield	UCPSS Winfield	UCPSS Winfield	
Breed of sire		Hereford	Hereford	Hereford	Hereford	
Breed of dam		Hereford	3/4 Here. 1/4 Char.	3/4 Here. 1/4 B. S.	3/4 Here. 1/4 Hols.	
Line or group[1]		Control	Backcross	Backcross	Backcross	
Percent used in project		100	100	100	100	
Inventory as of December 31, 1974	Cows 2 years and over	0	0	0	0	
	Yearling heifers	0	0	0	0	
	Bulls and steers under 1 year	0	0	0	0	
	Heifers under 1 year	0	0	0	0	
	Bulls over 1 year	0	0	0	0	
	Steers over 1 year	0	0	0	0	
Repro. perf.	Percent pregnant[2]	80.0	88.5	89.3	94.7	
	Calf survival percent[3]	81.2	100.0	88.0	94.4	
Wean. perf.	Adj. ADG[4]	1.44	1.70	1.73	1.77	
	Ave. type sc.[5]	12.5	12.7	13.1	13.9	
Postweaning performance	No. of bulls	0	0	0	0	
	No. of heifers	8	17	14	6	
	No. of steers	5	6	8	11	
Slaughtered	No. of bulls	0	0	0	0	
	No. of heifers	0	0	0	0	
	No. of steers	5	6	8	11	

Remarks: *All cows weaned last calf crop and were sold. These calves are on test now.

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments. (To steer & mature dam)

[5]Suggest S-10 scoring system indicate if different.

S-10-1 (Rev.)

UNIVERSITY OF ARKANSAS
Agricultural Experiment Station
Fayetteville, Arkansas

I. PROJECT: Hatch 170

Evaluation of performance records of beef cattle.

II. OBJECTIVES:

Continue to develop practical but adequate methods of identifying, evaluating and propagating the genetic potential for the production of beef.

III. PERSONNEL:

C. J. Brown, R. S. Honea and L. O. Brown

IV. ACCOMPLISHMENTS DURING THE YEAR:

Purebred herds of Polled Hereford, Hereford, Angus and Charolais were maintained at the Main Experiment Station as indicated on the accompanying inventory sheet. These herds are continued to provide data relative to the general project outline. Certain specific analyses on data from these herds will be referred to in this report.

The completed analysis of the four-year experiment in which Hereford, Angus, Charolais and Santa Gertrudis bulls were mated to Hereford and Angus cows was completed and a manuscript prepared for publication as a station bulletin. This bulletin is currently in the hands of the printer. The data on preweaning growth has previously been reported, but the analyses of carcass and eating quality traits from the steers on this project have not been reported.

In Table 1, the means of slaughter and carcass traits characterizing these steers according to breed of sire and breed of dam are presented. Differences among sires were significant for carcass weight, yield, grade, yield-grade, and ribeye area. Differences due to dams and sire x dam interaction were not significant for these traits. It is of interest that some steers in all breeding groups failed to attain slaughter weights. Steers sired by Santa Gertrudis and Charolais bulls were younger at slaughter. Santa Gertrudis cross steers dressed higher and thus yielded heavier carcasses than the other three sire groups. Santa Gertrudis and Charolais steers tended to have longer carcasses, grade lower and have yield grades indicating leaner carcasses. Charolais cross steers had the largest ribeye areas of the four sire groups.

Various measurements of fatness and wholesale cut weights and percentages are presented in Table 2. Differences among sires were significant for all measures of fatness. Differences between dam breeds and the sire x dam interaction was not significant for any of the measures of fatness.

There were significant differences due to sires for all wholesale cut weights except the rib and sirloin cuts. These significant sire differences were also evident for the percentages of carcass weight that these cuts represented. Differences among dams were not significant except for brisket, round and loin. The percentage of the carcass in these cuts also differed significantly between dam breeds. Although these differences were statistically significant in most cases, they were relatively small. Data on physical separation, chemical analysis and histological examination is presented in Table 3. Objective measurements of color were determined with a photovolt Model 610 reflectance meter. One inch thick steaks were scored by a ten member trained Taste Panel. The steaks were cooked to an internal temperature of 169°F in a 350° oven.

The effect of cross breeding on color, physical separation, chemical analysis, fiber diameter and sarcomere length are presented in Table 3. No differences were found either in the reflectance taken 30 minutes after ribbing or the reflectance of the raw samples. The reflectance using the amber filter gave differences due to sire group. The Charolais steers had lesser amounts of separable fat in the carcass, and separable fat in the wholesale rib. These steers also had more separable lean in the wholesale rib. There were no differences in the amount of bone found in any of the dam or sire groups. The Charolais cross steers had higher moisture and protein concentrations. The steers from the Angus cows had higher amounts of waste and lower fat concentrations in the composite sample of the wholesale rib and the rib eye sample. The cooking loss of the Quadriceps femoris muscle was the only difference in cooking losses found. The Charolais steers had larger Psoas major and Quadriceps femoris muscle fiber diameter. There was no difference found in the sarcomere length of the Longissimus dorsi, Psoas major, and Quadriceps femoris muscles. Table 4 presents the effect of these crosses on the sensory characteristics of three beef muscles on these steers. Very few differences due to cross breeding in these characteristics were found.

With the establishment of a cow herd at the Pine Tree Land Use Project near Forrest City an opportunity was provided to study beef production under conditions typical of eastern Arkansas. These conditions differ considerably with those found in the Ozark upland which can be represented by the cattle maintained at the Main Experiment Station near Fayetteville. Lifetime growth curves of females at the two locations were studied using the nonlinear regression model for weight on age as described in detail in the Experiment Station Bulletin 773 and 774 which have been previously reported.

Figure 1 and Figure 2 present the lifetime growth curves for Hereford and Angus, respectively. The Angus herd at Pine Tree was established from the division of the herd of Angus at the Livestock Forestry Station, half of which were moved to the Fayetteville location and half of which were moved to Pine Tree, and from the transfer of a group of cows from Fayetteville to the Pine Tree location. Thus the two groups of cattle considered in this report have similar pedigrees and are of a similar genetic background. Angus bulls used in the Pine Tree herd were Performanced Tested Bulls that originated in the Fayetteville herd. It can be observed that the mature weight (A) of the Angus cows at the Fayetteville location were about 50 pounds above the Angus cows of similar breeding at the Pine Tree location. The general rate of maturing of these two groups of cows were approximately the same. This suggests that the effect of the environmental differences encountered at these two locations was to reduce mature size with relatively little effect on the general maturing rate. It is of interest to note that mature weight was more sensitive to the environmental effects than rate of maturing and to note that the weaning weights observed in these two groups of cows parallel the difference in mature size. In fact, smaller weights at all corresponding ages have been observed at the Pine Tree location. These weaning weights as indicated in previous papers represent approximately 51% of the mature cow weights at the Pine Tree location which is identical with the 51% of mature weight that is weaned by the cows at the Fayetteville location. Differences in mature weight of Hereford cows at these two locations have also been observed. The genetic background of the two Hereford groups were not as similar as those of the Angus. They differed in that the origin of the cows were not as similar, but most of the bulls used in Hereford herd at Pine Tree originated in the Fayetteville herd. These observations suggest that the environment can limit the development pattern of similar genetic groups.

In addition to the manuscripts referred to above a manuscript for a station bulletin reviewing and summarizing 10 years of Cooperative Bull Testing at the Arkansas station has been prepared and is in the hands of the printers. Two Masters theses have been prepared. Other activities related to data collection and assembly of information concerning the various cross bred cattle at branch stations have been pursued. As these experiments progress reports will be made.

V. PUBLICATIONS:

Brown, C. J., James M. Moss and Lans O. Brown. 1974. Performance of Bulls on Arkansas Cooperative Beef Bull Performance Test 12. Ark. Agri. Exp. Sta. Rpt. Series 218.

Brown, C. J., P. K. Lewis, Jr. and O. G. Van Brunt. 1974. Carcass Characteristics of crossbred steers from four breeds of bulls. 10th Annual Ark. Ani. Sci. Res. Conf. pp 4.

Lewis, P. K., Jr., C. J. Brown, K. R. Campbell, L. Younger, J. Russell and M. C. Heck. 1974. Physical and chemical characteristics of meat of crossbred steers. 10th Annual Ark. Ani. Sci. Res. Conf. pp 8.

Ray, M. L., C. J. Brown, R. M. Smith, Jr., and Gerald Alexander. 1974. Effect of cow breed in calf weaning weight as a percent of cow weight. 10th Annual Ark. Ani. Sci. Res. Conf. pp 37.

Brown, C. J., Ton Jenkins and M. L. Ray. 1974. Growth patterns at two locations. 10th Annual Ark. Ani. Sci. Res. Conf. pp 41.

Brown, C. J., R. S. Honea and Z. Johnson. 1974. K-40 Estimates of leanness of performance tested beef bulls. 10th Annual Ark. Ani. Sci. Res. Conf. pp 49.

Worthington, John. 1975. Preweaning development of beef calves in a select herd. Masters Thesis. U of A Library.

Daley, Raymond G. 1975. Yearling weights and measurements as predictors of past weaning performance of bulls on feed test. Masters Thesis. U of A Library.

TABLE 1. SLAUGHTER AND CARCASS TRAITS OF CROSSBRED STEERS

Dam breed	Trait	Sire breed H	A	SG	C
H	Number of steers	6	5	11	7
	Ave. slaughter age (days)	482	474	452	458
	Range slaughter weights (lbs.)	864-1008	910-1026	905-1040	934-1036
	Yield (%)	59.1	57.5	60.5	58.6
	Carcass weight (lbs.)	567	562	585	569
	Carcass length (ins.)	44.9	44.9	46.1	45.9
	Carcass grade	12.3	12.7	11.2	11.1
	Yield-grade	4.3	4.5	3.9	3.0
	Ribeye area	9.6	9.7	9.4	11.3
A	Number of steers	14	5	14	14
	Ave. slaughter age (days)	483	471	422	444
	Range slaughter weights (lbs.)	872-1006	850-1004	974-1022	938-1054
	Yield (%)	59.5	58.1	60.4	57.6
	Carcass weight (lbs.)	568	526	586	568
	Carcass length (ins.)	44.8	44.3	46.2	46.5
	Carcass grade	13.3	12.1	12.4	11.3
	Yield-grade	3.8	3.8	4.1	3.1
	Ribeye area	10.3	9.8	10.0	10.9

TABLE 2. FATNESS AND CUT-OUT OF CROSSBRED STEERS FROM TWO DAM BREEDS AND FOUR SIRE BREEDS

Trait	Dam breed		Sire breed			
	A	H	A	H	C	SG
Number	47	29	10	20	21	25
Fat thickness 3rd rib	0.66	0.69	0.76	0.79	0.48	0.68
Fat thickness 12th rib	0.63	0.64	0.74	0.69	0.52	0.59
Fat thickness last vertebrae	0.57	0.58	0.59	0.66	0.50	0.56
Kidney fat (%)	4.0	3.9	4.0	4.1	3.2	4.5
Marbling	6.7	6.9	6.1	6.4	7.7	7.0
Foreshank (lbs.)	19.1	19.3	17.6	18.7	20.3	20.0*
Chuck (lbs.)	145.5	145.6	138.0	144.6	149.4	150.0*
Rib (lbs.)	43.6	43.7	43.0	44.1	43.8	43.8
Plate (lbs.)	56.7	50.9	52.8	51.9	48.4	54.2*
Brisket (lbs.)	22.4	24.1*	25.0	24.4	20.4	23.1*
Foreshank (%)	3.5	3.5	3.3	3.4	3.7	3.5*
Chuck (%)	26.1	25.7	25.4	25.7	26.6	25.9*
Rib (%)	7.8	7.8	7.9	7.9	7.9	7.6
Plate (%)	9.5	9.0*	9.7	9.3	8.6	9.4*
Brisket (%)	4.0	4.3*	4.6	4.4	3.7	4.0*
Round (lbs.)	101.9	105.3*	95.1	100.9	111.9	106.6*
Rump (lbs.)	26.7	26.5	25.5	26.5	27.9	25.5*
Loin (lbs.)	38.3	40.5*	36.5	39.2	42.1	39.9*
S. Loin (lbs.)	37.8	38.9	36.6	39.7	38.3	38.8
Flank (lbs.)	3.8	3.7	4.0	3.7	3.2	4.0*
Round (%)	18.3	18.6	17.6	17.9	19.9	18.5*
Rump (%)	4.8	4.7	4.8	4.7	5.0	4.4*
Loin (%)	6.9	7.2*	6.7	7.0	7.6	6.9*
S. Loin (%)	6.8	6.8	6.8	6.8	6.8	6.7
Flank (%)	0.7	0.7	0.7	0.7	0.6	0.7*

*P<0.01

TABLE 3. EFFECT OF CROSSBREEDING ON CERTAIN MUSCLE CHARACTERISTICS OF BEEF

	AA	AH	HA	HH	CA	CH	SgA	SgH	Significant Difference
Number of Animals	5	5	14	6	14	7	14	11	
Reflectance									
Raw amber, %									
LD	16.9	18.3	17.2	16.2	16.2	15.5	17.1	17.2	
PS	17.3	21.9	19.9	19.5	19.8	19.9	20.3	21.6	
QF	18.4	21.3	19.0	18.5	17.9	16.9	18.8	20.0	
Raw Green, %									
LD	13.9	14.6	13.5	12.8	13.0	12.4	13.7	13.8	
PS	14.3	17.7	16.4	16.4	16.2	16.4	16.7	17.7	
QF	15.1	17.7	15.8	15.7	14.5	14.1	15.7	16.5	
Raw Blue %									
LD	9.8	9.8	9.3	8.9	9.0	8.8	9.9	9.9	
PS	10.3	12.1	11.7	11.9	11.5	11.9	12.1	12.7	
QF	10.7	12.7	11.5	11.0	10.5	10.2	11.1	11.8	
Cooked Amber, %									
LD	12.8	12.7	12.0	13.2	13.6	11.1	13.5	13.2	*
PS	8.7	9.0	8.5	9.8	9.8	10.1	8.6	9.8	*
QF	10.9	10.3	10.3	10.7	11.5	11.2	11.5	10.6	
Cooked Green, %									
LD	10.8	10.7	10.4	11.4	11.9	10.0	11.3	11.2	
PS	7.6	8.0	7.4	8.6	8.6	8.5	7.6	8.4	
QF	9.0	8.8	8.7	9.0	9.8	9.4	9.9	9.2	
Cooked Blue,%									
LD	7.5	7.6	7.3	7.9	8.4	7.4	8.1	7.9	
PS	5.5	5.6	5.3	5.7	5.8	6.1	5.4	6.0	
QF	6.6	6.5	6.4	6.6	6.9	6.8	7.1	6.4	
Physical Separation of Carcass									
% Bone	12.7	13.0	12.6	13.2	13.1	12.7	11.6	12.6	
% Fat	18.0	18.2	18.5	18.8	14.1	12.8	18.1	17.5	**
Physical Separation of Rib									
% Bone	14.6	14.2	14.4	14.9	15.4	16.2	14.4	15.5	
% Fat	28.0	30.0	28.4	29.5	22.3	21.6	28.7	25.8	**
% Lean	55.0	53.9	54.9	53.7	59.6	60.2	55.4	56.6	**
% Rib eye	19.5	18.3	19.0	17.6	20.7	20.6	18.7	18.2	**
% Waste	2.2	1.7	1.7	1.4	2.3	1.7	2.0	2.0	*

Table 3. (continued)

	AA	AH	HA	HH	CA	CH	SgA	SgH	Significant Difference
Chemical Composition of Rib,%									
Composite Sample									
Moisture	46.2	44.2	46.3	45.6	52.1	54.7	47.2	49.1	**
Protein	11.6	11.3	12.7	12.1	13.6	14.1	12.2	13.7	**
Fat	38.7	41.2	38.9	39.7	30.9	27.8	37.6	35.0	**
Ash	.1	.1	.1	.1	.1	.1	.1	.1	
Rib eye sample									
Water	69.5	67.8	69.5	70.6	71.0	71.6	70.2	70.7	**
Protein	18.5	19.0	19.2	19.4	19.6	19.1	19.7	20.1	*
Fat	8.0	8.9	7.4	6.2	5.2	4.6	6.4	5.8	**
Ash	1.1	1.1	1.0	1.1	1.1	1.1	1.1	1.1	
Cooking Loss, %									
LD	39.7	37.4	38.9	38.5	39.2	38.0	39.6	39.5	
PS	39.7	39.4	40.9	39.6	41.4	41.2	39.3	40.6	
QF	37.2	38.4	38.5	38.3	39.5	36.8	38.9	40.4	*
Fiber Diameter, μ									
Raw									
LD	53.5	50.6	52.2	50.6	50.5	50.3	53.1	51.1	
PS	40.7	36.8	35.7	33.8	37.0	33.4	36.8	34.1	**
QF	50.5	46.3	46.7	46.0	48.7	47.0	45.9	44.7	**
Sarcomere Length, μ									
Raw									
LD	1.9	1.9	1.8	1.8	1.9	1.8	1.9	1.9	
PS	3.5	3.4	3.4	3.6	3.4	3.5	3.4	3.4	
QF	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.0	

TABLE 4. EFFECT OF CROSSBREEDING ON CERTAIN SENSORY CHARACTERISTICS OF BEEF[a]

	AA	AH	HA	HH	CA	CH	SgA	SgH	Significant Difference
Number of Animals	5	5	14	6	14	7	14	11	
Acceptability of aroma									
LD	5.64	5.48	5.77	5.71	5.51	5.63	5.42	5.53	
PS	5.89	6.16	6.13	6.06	5.94	5.93	5.86	5.95	
QF	5.29	5.35	5.34	5.32	5.30	5.03	5.31	5.34	
Intensity of aroma									
LD	4.50	4.41	4.62	4.42	4.28	4.39	4.11	4.13	
PS	4.74	5.07	4.99	4.87	4.70	4.68	4.55	4.72	
QF	4.57	4.72	4.36	4.25	4.27	4.02	4.20	4.15	*
Acceptability of flavor									
LD	5.55	5.80	5.74	5.81	5.44	5.49	5.40	5.56	
PS	5.60	5.94	5.07	6.06	5.72	5.92	5.80	5.90	*
QF	4.72	5.05	5.13	5.18	5.12	4.80	5.14	5.14	
Intensity of flavor									
LD	4.90	4.68	4.97	4.72	4.80	4.63	4.58	4.57	*
PS	5.05	5.07	5.17	5.07	5.08	5.04	4.96	5.09	
QF	4.76	4.86	4.72	4.65	5.71	4.62	4.64	4.55	
Texture									
LD	5.51	5.58	5.42	5.52	5.59	5.22	5.50	5.58	
PS	6.02	6.09	5.99	6.01	5.93	5.83	5.93	5.95	
QF	5.74	5.70	5.59	5.80	5.65	5.56	5.75	5.61	
Tenderness									
LD	5.58	5.83	5.43	5.46	5.60	5.09	5.35	5.45	
PS	5.52	6.78	6.60	6.74	6.40	6.27	6.40	6.50	
QF	5.73	5.93	5.51	5.88	5.58	5.49	5.63	5.41	
Juiciness									
LD	5.40	5.61	5.37	5.54	5.25	5.30	5.40	5.21	
PS	5.32	4.96	5.04	5.12	4.81	4.90	5.00	4.90	
QF	5.34	5.23	5.53	5.78	5.48	5.74	5.62	5.35	
Overall Evaluation									
LD	5.29	5.43	5.35	5.37	5.17	5.14	5.10	5.24	
PS	5.51	5.78	5.83	5.77	5.56	5.67	5.56	5.70	*
QF	4.64	4.88	4.92	5.04	4.90	4.71	4.93	4.96	
Doneness									
LD	5.80	5.53	5.82	5.37	5.67	5.52	5.58	5.52	
PS	6.22	6.48	6.44	6.32	6.49	6.37	6.32	6.42	
QF	5.00	5.54	5.20	4.92	5.03	4.50	4.89	5.37	*

Table 4. (continued)

	AA	AH	HA	HH	CA	CH	SgA	SgH	Significant Difference
Shear Force									
LD	4.6	3.1	4.7	4.6	3.8	4.8	4.5	4.2	
PS	2.8	2.0	2.9	2.5	3.2	3.3	3.2	3.0	
QF	2.6	2.7	3.3	3.6	3.9	3.2	3.6	4.0	

[a]Average score of 10 judges who scored duplicate samples. Scores ranged from 9, which was very desirable, to 1, which was unacceptable.

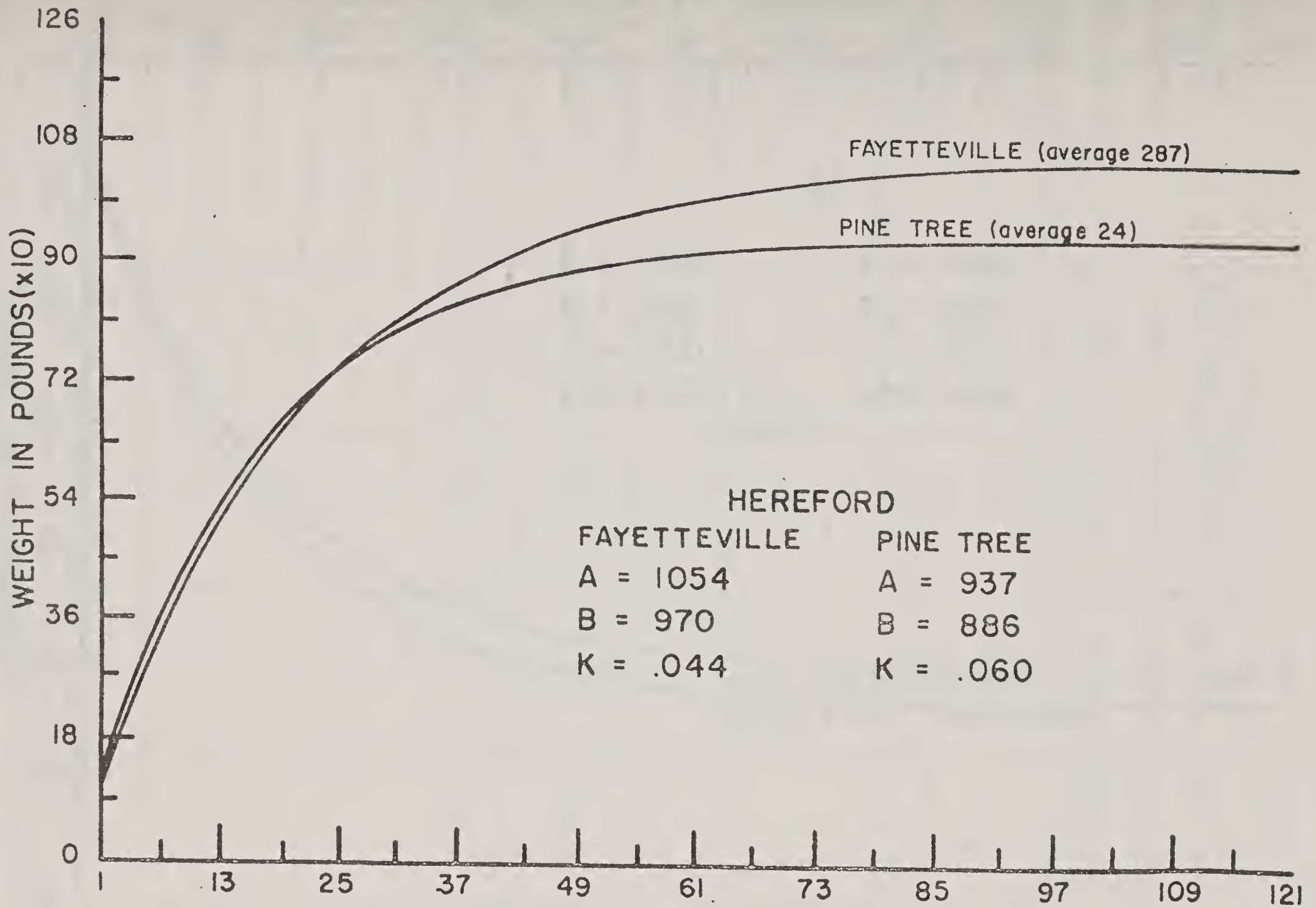

Figure 1. Age in Months

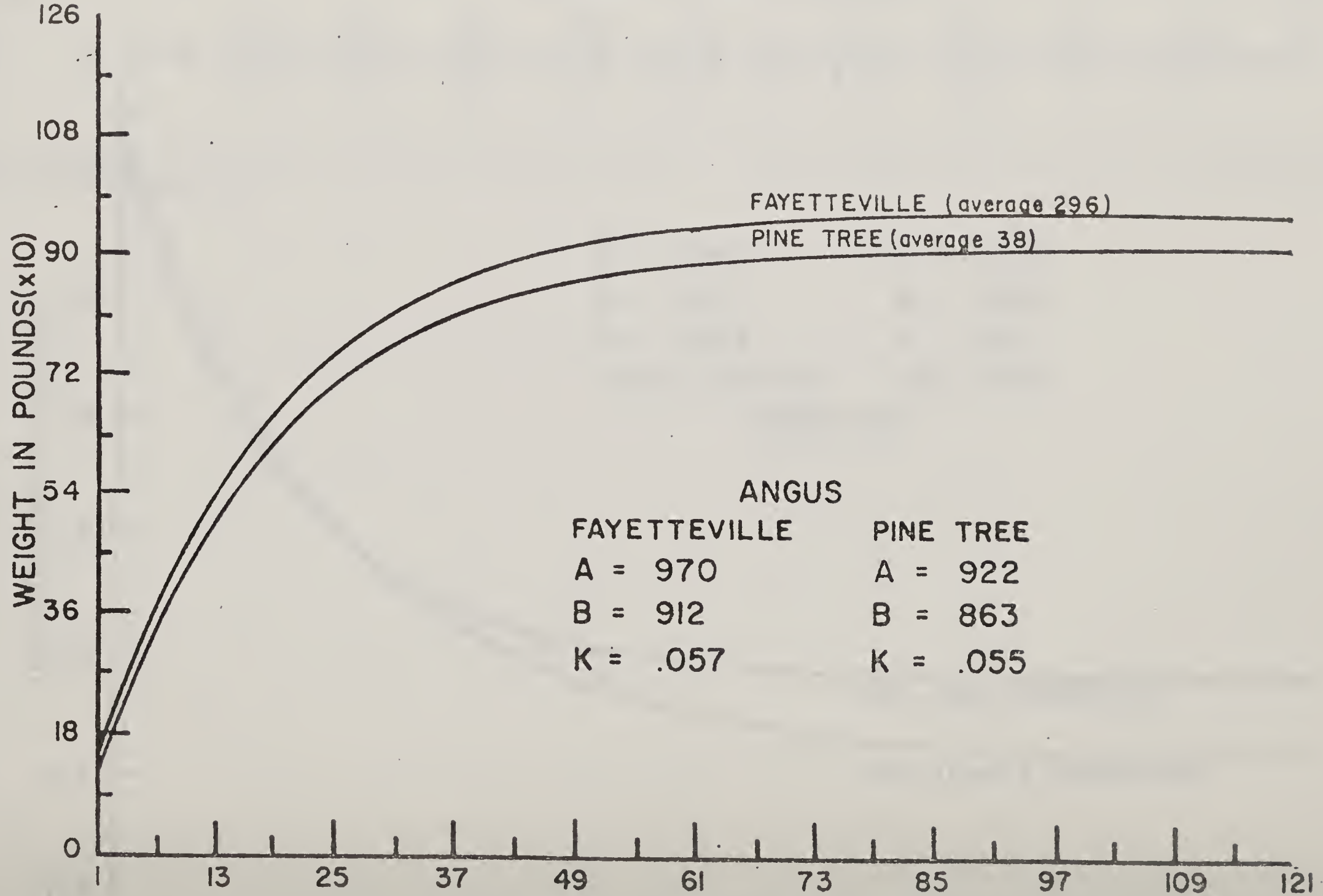

Figure 2. Age in Months

Production, Inventory and Performance Data, S-10 Herds - 1974

State Arkansas

Location		Main Sta.	Main Sta.	Main Sta.	Main Sta.	
Breed of sire		Angus	Hereford	P. Hereford	Charolais	
Breed of dam		Angus	Hereford	P. Hereford	Charolais	
Line or group[1]		PB	PB	PB	PB	
Percent used in project		100	100	100	100	
Inventory as of December 31, 1974	Cows 2 years and over	199	41	71	16	
	Yearling heifers	50	14	21	5	
	Bulls and steers under 1 year	71	21	27	5	
	Heifers under 1 year	81	22	24	4	
	Bulls over 1 year	26	7	13	3	
	Steers over 1 year	0	0	0	0	
Repro. perf.	Percent pregnant[2]	93%	86%	92%	75%	
	Calf survival percent[3]	99%	94%	98%	100%	
Wean. perf.	Adj. ADG[4]	1.65	1.65	1.60	1.83	
	Ave. type sc.[5]	12	12	13	12	
Postweaning performance	No. of bulls	30	7	13	2	
	No. of heifers	41	12	18	4	
	No. of steers	0	0	0	0	
Slaughtered	No. of bulls	16	8	6	0	
	No. of heifers	0	0	0	0	
	No. of steers	0	0	0	0	

Remarks

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments. Male, 205 da.

[5]Suggest S-10 scoring system· indicate if different.

UNIVERSITY OF FLORIDA
Agricultural Experiment Station
Gainesville, Florida

I. PROJECT: 1003.

Body size in cattle as related to adaptation in Florida's climatic environment.

II. OBJECTIVES:

To determine the performance of cattle selected for (a) large skeletal size vs. (b) indications of adaptability as reflected in thrift and vitality.

III. PERSONNEL:

M. Koger and F. S. Baker

IV. ACCOMPLISHMENTS DURING THE YEAR:

Starting with a foundation of Florida commercial cows two groups have been upgraded to Angus bulls with contrasting characteristics; one set of sires being of large genetic size, the other of smaller size but with indications of good adaptability to the area. The only obvious response to date has been in that of skeletal size of the two groups. Detailed observations on fertility rate in brood cows and on growth, feedlot performance and carcass characteristics are in progress. These studies should be completed in one year.

I. PROJECT: 1180.

Selection of replacement females in beef cattle.

II. OBJECTIVES:

To compare genetic progress and economic returns from selecting replacements on their own calfhood performance as versus selection on the basis of production records.

III. PERSONNEL:

M. Koger and F. S. Baker.

IV. ACCOMPLISHMENTS DURING THE YEAR:

The 1974 calf crop will complete the first data set from this project to be analysed. Analyses will proceed in 1975. Preliminary indications suggest that the increased productivity resulting from culling cows on the basis production has been approximately offset by the inclusion of a higher percentage of young cows in this group.

I. PROJECT: 1263.

Selection for maternal ability in beef cattle.

II. OBJECTIVES:

To compare maternal ability of dam versus individual excellence in weight and grade at 20 months of age as selection criteria in improvement of beef cattle.

III. PERSONNEL:

J. R. Crockett and M. Koger

IV. ACCOMPLISHMENTS DURING THE YEAR:

Analyses of data from this project were initiated. A preliminary report from this project will be presented in the near future. From the material included in the tables attached (Brigton location) it will be noted that the over-all production performance of the grade Herefords in this project continues to be unexpectedly good.

I. PROJECT: 1471.

Beef and dairy x beef crosses for beef production in northern Florida.

II. OBJECTIVES:

(1) To obtain reproductive and performance information on beef and dairy x beef crosses. (2) To estimate phenotypic and genetic parameters.

III. PERSONNEL:

D. E. Franke

IV. ACCOMPLISHMENTS DURING THE YEAR:

Two hundred and nineteen calves were born in the 1974 calving season from various matings (H x H, H x F_1 (Hol x H), H x F_1 (BS x H), H x F_1 (A x H), A x A, A x F_1 (Hol x A), A x F_1 (BS x A), A x F_1 (H x A), C x F_1 (Hol x H), C x F_1 (BS x H), C x F_1 (Hol x A), and C x F_1 (BS x A). Two hundred and five calves were weaned at an average age of 210 days with Charolais (C) sired calves heaviest at 510 pounds, Brown Swiss (BS) and Holstein (Hol) sired calves at 450 pounds, Hereford (H) sired calves at 440 pounds and Angus (A) sired calves at 420 pounds. Cows palpated pregnant were 86.2%. Most open cows were old (10 years +) Hereford cows and young Dairy x Beef females nursing first calves. The project will be continued for three years to obtain additional back cross and three-breed cross calves.

I. PROJECT: 1563.

Evaluation of different breeds for commercial beef production in south Florida.

II. OBJECTIVES:

To test new genetic material in comparison with stocks already in the area for beef production in south Florida.

III. PERSONNEL:

J. R. Crockett

IV. ACCOMPLISHMENTS DURING THE YEAR:

The third calf crop from the trial were weaned during the summer of 1974. The data are being processed for presentation at the Southern Section, ASAS in February, 1975.

I. PROJECT: 1679.

Fertility, growth and maternal ability in Angus, Brahman, Charolais and crosses of the breeds.

II. OBJECTIVES:

(1) To compare the fertility and maternal ability of straightbred, first-cross, backcross and three-breed cross dams utilizing all possible combinations of the three parent breeds. (2) To compare levels of heterosis for weaning performance in straightbred, F_2, backcross, three-breed cross, two-breed rotation and three-breed rotation cross calves. (3) To determine the breeding value of F_1 bulls.

III. PERSONNEL:

F. M. Peacock, M. Koger, D. E. Franke and A. C. Warnick.

IV. ACCOMPLISHMENTS DURING THE YEAR:

This project represents the terminal phase of a multiple-stage crossbreeding study. The first matings for this project were made in 1974. Data will not be available until 1975.

I. PROJECT: 1612

Biological and environmental aspects of dairy - beef crosses on pasture and in drylot.

II. OBJECTIVES:

To compare the performance of beef and dairy x beef crosses under different systems of production varying in level of confinement.

III. PERSONNEL:

D. E. Franke and R. L. Shirley

IV. ACCOMPLISHMENTS DURING THE YEAR:

Two hundred twenty-five calves were weaned from the 1974 calving season (second year of the project) with an adj. 205 day weight of 490 pounds. Survival rate from birth to weaning was 95%. Forty-nine intact bull calves averaged 524 pounds, 29 steer calves averaged 499 pounds, 35 Russian castrates averaged 513 pounds and 112 heifers averaged 465 pounds. Adj. weaning weights by breed of calf for A, BS, F_1, A x BS, 3/4A - 1/4BS, 3/4BS - 1/4A, 2/3A - 1/3B and 2/3B - 1/3BS were 422, 556, 480, 525, 449, 477 and 533 pounds respectively. Pregnancy rates for A, BS, F_1, A x BS, 2/3A - 1/3B and 2/3B - 1/3A cows were 90, 80,89 31 and 100 percent, respectively. The 31 percent pregnancy rate was due to an infertile bull. Male calves were placed on a feeding trial in October to study differences between effects of rations and type of male on growth and carcass responses.

V. PUBLICATIONS:

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Wong, Y. K. 1974. Genetic aspects of growth curves of Angus, Brahman, Hereford and Santa Gertrudis females. M. S. Thesis. University of Florida.

Production, Inventory and Performance Data, S-10 Herds - 1974

State Florida

Location		Gainesville	Ona	Belle Glade	Brighton	Quincy
Breed of sire		Various	Various	Various	Gr. Hereford	Angus
Breed of dam		Various	Various	Various	Gr. Hereford	Angus
Line or group[1]		Various	Various	Various	Brighton	Female Selection
Percent used in project		100	50	100	100	50
Inventory as of December 31, 1974	Cows 2 years and over	250	592	286	268	124
	Yearling heifers	44	230	90	80	30
	Bulls and steers under 1 year	84	230	112	97	52
	Heifers under 1 year	112	234	110	100	46
	Bulls over 1 year	16	21	18	72	56
	Steers over 1 year	0	0	0	0	0
Repro. perf.	Percent pregnant[2]	90	90	87	94	100
	Calf survival percent[3]	93	93	90	98	97
Wean. perf.	Adj. ADG[4]	1.84	1.75	1.65	1.75	1.75
	Ave. type sc.[5]	13	11	12	12	11
Postweaning performance	No. of bulls	0	0	0	54	42
	No. of heifers	51	230	90	80	30
	No. of steers	0	77	63	0	0
Slaughtered	No. of bulls	0	0	0	0	0
	No. of heifers	0	0	0	0	0
	No. of steers	0	77	63	0	0

Remarks

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system: indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1974

State Florida

Location		Raiford				
Breed of sire		Angus				
Breed of dam		Gr. Angus				
Line or group[1]		Raiford				
Percent used in project		50				
Inventory as of December 31, 1974	Cows 2 years and over	1040				
	Yearling heifers	385				
	Bulls and steers under 1 year	400				
	Heifers under 1 year	386				
	Bulls over 1 year	60				
	Steers over 1 year	0				
Repro. perf.	Percent pregnant[2]	70				
	Calf survival percent[3]	83				
Wean. perf.	Adj. ADG[4]	1.44				
	Ave. type sc.[5]	11				
Postweaning performance	No. of bulls	0				
	No. of heifers	385				
	No. of steers	0				
Slaughtered	No. of bulls	0				
	No. of heifers	0				
	No. of steers	0				

Remarks

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system: indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1974

State Florida

Location		Brooksville	Brooksville	Brooksville	Brooksville	Brooksville
Breed of sire		Angus	Brahman	G.Brahman	B.G. Brahman	Brahman
Breed of dam		Angus	Brahman	G. Brahman	B.G. Brahman	Angus
Line or group[1]		Purebred	Purebred	G_2	BG_2	F_1
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1974	Cows 2 years and over	224	50	51	65	50
	Yearling heifers	72	22	19	23	17
	Bulls and steers under 1 year	83	9	28	9	20
	Heifers under 1 year	0	0	0	0	0
	Bulls over 1 year	15	4	4	4	0
	Steers over 1 year	0	0	0	0	0
Repro. perf.	Percent pregnant[2]	83	81	98	97	86
	Calf survival percent[3]	92	94	98	100	70
Wean. perf.	Adj. ADG[4]	407	408	490	399	446
	Ave. type sc.[5]	12.3	11.7	12.4	11.7	12.5
Postweaning performance	No. of bulls	82	10	17	20	12
	No. of heifers	67	8	14	14	6
	No. of steers	0	0	0	0	0
Slaughtered	No. of bulls	0	0	0	0	0
	No. of heifers	0	0	0	0	0
	No. of steers	0	0	0	0	0

Remarks

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments.

[5]Suggest S-10 scoring system· indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1974

State Florida

Location		Brooksville	Brooksville	Brooksville		
Breed of sire		Hereford	Hereford	Hereford		
Breed of dam		Hereford	Hereford	Hereford		
Line or group[1]		Line 4	Line 5	Line 6		
Percent used in project		100	100	100		
Inventory as of December 31, 1974	Cows 2 years and over	73	7	66		
	Yearling heifers	33	1	19		
	Bulls and steers under 1 year	22	8	12		
	Heifers under 1 year	0	0	0		
	Bulls over 1 year	5	0	5		
	Steers over 1 year	0	0	0		
Repro. perf.	Percent pregnant[2]	84	48	88		
	Calf survival percent[3]	84	100	81		
Wean. perf.	Adj. ADG[4]	379	369	413		
	Ave. type sc.[5]	13.1	12.7	12.4		
Postweaning performance	No. of bulls	28	3	18		
	No. of heifers	30	3	24		
	No. of steers	0	0	0		
Slaughtered	No. of bulls	0	0	0		
	No. of heifers	0	0	0		
	No. of steers	0	0	0		

Remarks

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments.

[5]Suggest S-10 scoring system indicate if different.

GEORGIA COASTAL PLAIN EXPERIMENT STATION
Tifton, Georgia

I. PROJECT: Hatch 224 (S-10)

Improvement of performance and carcass quality in beef cattle through selection.

II. OBJECTIVES:

To develop herds of Polled Hereford and Angus cattle with superior performance.

To progeny test Polled Hereford and Angus sires with selection criteria based primarily on pre- and post-weaning growth rate and carcass meatiness and tenderness.

To compare performance of crossbred Simmental x Polled Hereford cattle with Polled Herefords and ultimately grade up to "purebred" Simmentals.

III. PERSONNEL:

W. E. Neville, Jr. and W. C. McCormick

IV. ACCOMPLISHMENTS DURING THE YEAR:

The Polled Hereford and Angus herds were mated artifically and naturally while all Simmental cross cattle were the result of artificial matings to two sires. Eighteen 1/2 and 3/4 Simmental calves were born in 1973. All calves were born January to April and weaned in September. Bull calves were fed 168 days post-weaning. Replacement females were selected at weaning and fed to gain about 1 lb. daily until small grain pasture became available in early December. Post-weaning performance was recorded under this limited-feed winter pasture system. The remaining heifers were culled and used in other studies.

Table 1 is a summary of 168-day A.D.G. of bulls by breed and sire. Table 2 is a summary of 168-day post-weaning record of heifers by breed.

Table 1. Post-weaning Performance of 1973 Bull Calves

Breed	Sire	No. Bulls	A.D.G. lb.	Final Age, days	Final Wt., lb.	WPDA lb.
PH	643	1	2.70	421	984	2.34
PH	943	9	2.56	390	878	2.25
PH	125	9	2.79	386	957	2.49
PH	367	1	2.50	405	912	2.25
PH	615	4	2.90	388	897	2.30
A	56	7	2.71	408	997	2.44
A	014	8	2.53	408	944	2.32
Sim.	Eiger	2	3.14	377	1017	2.70
Sim.	Saxo	5	3.23	381	1038	2.73
Sim.	Firn	1	3.43	402	1052	2.62

Table 2. Post-weaning Record of Replacement Heifers

Breed	Heifers	168-day Gain	Final Age	WPDA lb.
A	12	1.12	406	1.68
PH	16	1.07	394	1.64
S - 1/2	3	1.31	388	1.67
S - 3/4	9	1.16	390	1.72

V. FUTURE PLANS:

The project will be revised in the immediate future.

VI. PUBLICATIONS DURING THE YEAR:

Routine Annual Reports.

I. PROJECT: State 2-99 (S-10)

Selection of beef cattle for single items of importance in profitable beef production.

II. OBJECTIVES:

To obtain preliminary information on the relative effectiveness of selecting for a single character.

To observe trends in characters for which no selection is made when selection is for a single character.

III. PERSONNEL:

W. E. Neville, Jr., James B. Smith and W. C. McCormick

IV. ACCOMPLISHMENTS DURING THE YEAR:

Four herds of grade Polled Hereford females, owned and maintained by the Georgia State Prison Farm, Reidsville, are used to study selecting for (1) weaning weight, (2) rate of postweaning gain, (3) type score, and (4) average performance. For the latter group, replacements with records nearest average for each trait are selected. Bulls used in all four groups are selected from the Polled Hereford herd at Tifton. Weaning data for the 1974 calf crop are shown in table 1.

Table 1. Weaning Data, Generation 2 Cows, 1974 Calf Crop

Herd	No. calves weaned	Avg. birth weight	ADG-birth to weaning	Weaning Scores Type	Condition
Average	56	69	1.46	11.3	9.6
Rate of gain	60	66	1.51	11.8	9.9
Score	55	66	1.39	11.2	9.5
Wean. weight	50	65	1.51	11.8	9.9

V. FUTURE PLANS:

Collection of data was completed with the weaning of the 1974 calf crop. The project will be terminated and final data will be prepared for publication.

VI. PUBLICATIONS DURING THE YEAR:

None

VII. PUBLICATIONS PLANNED:

Final analyses of data and publishing of same.

I. PROJECT: Hatch 209, AHRD d1-3 (S-10)

A study of grading, crisscrossing and rotational crossing as breeding systems for commercial beef production.

II. OBJECTIVES:

To study the relative value of grading, crisscrossing and rotational crossing as breeding systems for commercial beef production.

To study heterotic effects in crosses between Angus and Polled Hereford breeds, as compared to heterosis in crosses between these breeds and Santa Gertrudis - a breed based partially on a Brahman foundation.

To study the comparative value of the Santa Gertrudis breed with the Angus and Polled Hereford breeds.

III. PERSONNEL:

W. E. Neville, Jr., James B. Smith and W. C. McCormick

IV. ACCOMPLISHMENTS DURING THE YEAR:

Weaning data for the 1974 calf crop raised by generation 2 animals are as shown in the following table.

Table 1. Weaning Data, 1974 Calves, Generation 2 Cows.

Herd	Breeding System	No. Calves	Avg. Birth Wt.	ADG Birth to Weaning	Avg. Type Score	Avg. Condition Score
Gr. A	Grading-up	37	65	1.55	12.1	10.2
Gr. PH	Grading-up	34	64	1.33	11.5	9.4
Gr. SG	Grading-up	33	76	2.04	12.0	10.5
AxPH	Crisscross	52	66	1.60	12.1	10.5
AxSG	Crisscross	49	76	1.95	11.9	10.4
PHxSC	Crisscross	42	77	1.94	12.2	10.8
AxPHxSG	Rotational Crossing	71	72	1.85	12.4	10.7

V. FUTURE PLANS:

Collection of data was completed with the weaning of the 1974 calf crop. The study will be terminated and final data will be prepared for publication.

VI. PUBLICATIONS DURING THE YEAR:

None

VII. PUBLICATIONS PLANNED:

Final analyses of data and publishing of same.

Production, Inventory and Performance Data, S-10 Herds - 1974

State Georgia

Location		Reidsville	Reidsville	Reidsville	Reidsville	Reidsville
Breed of sire		A	PH	SG	A,PH	A,SG
Breed of dam		A	PH	SG	A x PH	A x SG
Line or group[1]		Grade	Grade	Grade	Crisscross	Crisscross
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1974	Cows 2 years and over	68	57	55	65	63
	Yearling heifers	11*	15*	12*	*	*
	Bulls and steers under 1 year	17	16	19	26	33
	Heifers under 1 year	20	18	14	26	16
	Bulls over 1 year	4	4	4	2	2
	Steers over 1 year	0	0	0	0	0
Repro. perf.	Percent pregnant[2]	78	71	74	100	100
	Calf survival percent[3]	93	97	97	98	100
Wean. perf.	Adj. ADG[4]	1.55	1.33	2.04	1.60	1.95
	Ave. type sc.[5]	12.1	11.5	12.0	12.1	11.9
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments: None

[5]Suggest S-10 scoring system indicate if different.

 *=Study being terminated.

Production, Inventory and Performance Data, S-10 Herds - 1974

State Georgia

Location		Reidsville	Reidsville	Reidsville	Reidsville	
Breed of sire		PH	PH	PH	PH	
Breed of dam		PH	PH	PH	PH	
Line or group[1]		Rate of gain	Wean Wt.	Type	Average	
Percent used in project		100	100	100	100	
Inventory as of December 31, 1974	Cows 2 years and over	59	50	49	45	
	Yearling heifers	*	*	*	*	
	Bulls and steers under 1 year	33	27	24	30	
	Heifers under 1 year	27	23	31	26	
	Bulls over 1 year	2	2	2	2	
	Steers over 1 year	0	0	0	0	
Repro. perf.	Percent pregnant[2]	100	100	100	100	
	Calf survival percent[3]	98	98	97	97	
Wean. perf.	Adj. ADG[4]	1.51	1.51	1.39	1.46	
	Ave. type sc.[5]	11.8	11.8	11.2	11.3	
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					

Remarks

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments: None

[5]Suggest S-10 scoring system: indicate if different.

 *=Study being revised.

Production, Inventory and Performance Data, S-10 Herds - 1974

State Georgia

Location		Tifton	Tifton	Tifton	Reidsville	Reidsville
Breed of sire		PH	A	Simmental	PH,SG	A,PH,SG
Breed of dam		PH	A	S x PH	PH x SG	A,PH,SG
Line or group[1]		Purebred	Purebred	Sim X	Crisscross	3-breed X
Percent used in project		80	80		100	100
Inventory as of December 31, 1974	Cows 2 years and over	74	38	20	48	75
	Yearling heifers	15	12	11	*	*
	Bulls and steers under 1 year	34	23	12	21	42
	Heifers under 1 year	18	14	9	21	29
	Bulls over 1 year	5	2	0	2	2
	Steers over 1 year	0	0	0	0	0
Repro. perf.	Percent pregnant[2]	95	96	65	98	100
	Calf survival percent[3]	93	93	92	98	99
Wean. perf.	Adj. ADG[4]	1.67**	1.91**	2.03**	1.94	1.85
	Ave. type sc.[5]				12.2	12.4
Postweaning performance	No. of bulls	34	23	11		
	No. of heifers	18	14	9		
	No. of steers	0	0	0		
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					

Remarks

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments: **=205-day sex and age of dam, others = none.

[5]Suggest S-10 scoring system: indicate if different.

S-10-1 (Rev.) *=Study being revised.

LOUISIANA STATE UNIVERSITY
Agricultural Experiment Station
Baton Rouge, Louisiana

I. PROJECT: Hatch 605 (Revised)

General Title: Breeding methods for beef cattle in the Southern region.

Specific Title: Evaluation of systematic rotational crossbreeding plans for producing beef cattle in the Gulf Coast region.

II. OBJECTIVES:

To evaluate the productivity, usefulness, practicality and management of systematic rotational crossbreeding systems using the Angus, Brahman, Charolais and Hereford breeds.

To estimate for these breeds genetic parameters of biological and economic traits.

To determine the degree of heterotic advantage maintained in subsequent generations of rotational crossbreeding.

To determine the relative productivity of various types of crossbred cows.

III. PERSONNEL:

Andrew C. Boston, George L. Robertson, T. D. Bidner, Paul E. Humes, F. Glen Hembry, Ted O. McRae and Dorothy C. Wilson

IV. ACCOMPLISHMENTS DURING THE YEAR:

1. Scope and nature of work:

Since this was a transition year between Phases I and II of the revised project, no calves were born on Project 605 in 1974. The 358 Phase I produced heifers were bred naturally, as outlined in the revised project procedure, for the first Phase II calf crop, spring 1975. This was the first exposure for the 1972 and 1973 born heifers, the second for the 1971 heifers and the third for the 1970 heifers. The 1970 and 1971 heifers were previously exposed to Red Poll bulls as outlined in the 1971 addendum to the revised project procedure. Even though dam age and dam birth year will be total confounded, the data from this (1975) and future calf crops of the 1972 and 1973 born heifers will furnish a comparison of the productivity through four calf crops from heifers exposed to have their first calf as either a 2- or 3-year-old.

The 89 head of 1973 Phase I steers completed 200 days on full feed in May 1974 and were slaughtered; complete carcass data were collected.

The Red Poll calves born in 1973 to the 1970 and 1971 Phase I heifers were early weaned at an average age of 147 days in April 1974. Following collection of routine weaning data, these 162 head of calves were sold to state supported research projects. The calves were early weaned to insure maximum rebreeding of their dams during the normal April 15 to July 1 breeding season for the first Phase II (1975) calf crop. These 1973 calves were the last Red Poll-sired progeny to be produced by the Phase I heifers.

No major difficulties have been encountered in the execution of the project. Routine facility repairs and management procedure adjustements have been made.

2. Research results:

A complete least squares and linear function statistical summary of all adjusted Phase I data, the 1970-73 calf crops, is presented in tables 1-12. The statistical model included factors for year, sex (where appropriate), breeding line, reciprocal cow breed within line, all two-way interaction, covariables for age-of-dam and calf birth-date (where appropriate) and management system (for the steer data only). For traits involving fertility, 0 and 1 measures of reproduction were used as there were many observations. Weight traits were multiplied times cow breeding type (reciprocal within line) reproductive rate average to create individual cow efficiency observations. The average cow age at parturition was 7.1 years, average calf birth date was February 15 and average calf weaning age was 230 days. The data are listed in tables 1, 2, 3, 7, 8 and 11 by breeding line and mating type and in tables 4, 5, 6, 9, 10 and 12 by reciprocal cow breed.

Tables 1 & 4 - Reproduction traits.
Tables 2 & 5 - Preweaning calf performance with weaning traits adjusted to a 230-day average weaning age. The calves were never creep-fed.
Tables 3 & 6 - Cow productivity and efficiency.
Tables 7 & 9 - Postweaning steer performance. Although the postweaning management of the steers varied from year to year as reported in previous annual reports, the statistical analyses found no significant ($P<.05$) steer management system by breeding line interactions. Thus, all four years of steer data are reported here as one group with an average final age of approximately 14 to 15 months. As explained in the footnotes to the last two columns of these tables, the values are based on only that half of the cow herd which, on the average, raises steers; thus, these estimates can be converted to a total cow herd basis by dividing each value by two.

Tables 8 & 10 - Steer carcass characteristics.
Tables 11 & 12 - Replacement heifer postweaning development.

The 60-day postbreeding palpation data on the 358 Phase I heifers exposed from April 15 to July 1, 1974 for Phase II calves are reported in table 13.

V. FUTURE PLANS:

Execution and data collection under the revised project outline and addendum will continue. All Phase I animals, except the replacement heifers (Phase II dams), have been disposed of. Phase II was initiated with the 1974 spring breeding season and will become a reality when the calves start arriving in early 1975. Feedlot facilities will continue to be provided for steers in a 1-year supplemental meat tenderness study (part of Project 1576 of the SM-43 Regional Project). The existing feedlot facilities will be remodeled with new fencing during 1975. A study of the readability and durability of four types of cattle ear tags will be conducted with the 1975 calf crop.

VI. PUBLICATIONS DURING THE YEAR:

Boston, Andrew C. 1974. Beef cattle crossbreeding--Project 605. 14th Livestock Producers' Day Report, Animal Science Dept., L.S.U., Baton Rouge, p. 71.

Davis, W. L., P. E. Humes, A. C. Boston and E. A. Icaza. 1974. Straightbred and singlecross cow repeatabilities. J. Anim. Sci. 39:143. (Abstr.).

Icaza, Emilio A. and Andrew C. Boston. 1974. Comparisons among straightbred and crossbred beef steers for postweaning performance. 14th Livestock Producers' Day Report, Animal Science Dept., L.S.U., Baton Rouge, p. 80.

Icaza, Emilio A., Andrew C. Boston and Paul E. Humes. 1974. Age of dam effects in straightbred beef cows. J. Anim. Sci. 39:145. (Abstr.).

Icaza, Emilio A., J. W. Turner and A. C. Boston. 1974. Comparative postweaning performance of crossbred steers. J. Anim. Sci. 38:216. (Abstr.).

Kendrick, Ronald R. and Andrew C. Boston. 1974. Productivity of straightbred, backcross and three-breed cross heifers. 14th Livestock Producers' Day Report, Animal Science Dept., L.S.U., Baton Rouge, p. 71.

Luckett, R. L., T. D. Bidner, E. A. Icaza and J. W. Turner. 1974. Tenderness studies in straightbred and crossbred steers. 14th Livestock Producers' Day Report, Animal Science Dept., L.S.U., Baton Rouge, p. 197.

VII. PUBLICATIONS SUBMITTED:

Boston, Andrew C. 1975. Beef cattle crossbreeding for Louisiana. 15th Livestock Producers' Day Report, Animal Science Dept., L.S.U., Baton Rouge. (Accepted for January publication).

Boston, Andrew C. and Emilio A. Icaza. 1975. Comparisons among seven beef crossbreeding systems. The Louisiana Cattleman. (Accepted for May publication).

Boston, Andrew C. and Emilio A. Icaza. 1975. Productivity of Reciprocal F_1 beef cows. The Louisiana Cattleman. (Accepted for July publication).

Boston, Andrew C. and Emilio A. Icaza. 1975. Back- and three-breed cross beef female productivity. J. Anim. Sci. (Abstract submitted for February Southern Section Meeting).

Boston, Andrew C., Emilio A. Icaza, George L. Robertson and Ted O. McRae. 1975. The effect of preshipment holding time on shrinkage of crossbred heifers. 15th Livestock Producers' Day Report, Animal Science Dept., L.S.U., Baton Rouge. (Accepted for January publication).

Davis, William L., Paul E. Humes, Andrew C. Boston and Emilio A. Icaza. 1975. Repeatability of weaning traits in straightbred and singlecross beef cows. 15th Livestock Producers' Day Report, Animal Science Dept., L.S.U., Baton Rouge. (Accepted for January publication).

Davis, W. L., P. E. Humes, A. C. Boston and E. A. Icaza. 1975. Repeatabilities for straightbred and singlecross beef cows for weaning traits. Louisiana Agriculture. (Accepted for publication in spring issue).

Davis, W. L., P. E. Humes, A. C. Boston and E. A. Icaza. 1975. Repeatability of weaning traits in straightbred and crossbred beef cows. The Louisiana Cattleman. (Accepted for April publication).

Icaza, Emilio A. and Andrew C. Boston. 1975. Maternal heterosis of backcross and three-breed cross beef females. J. Anim. Sci. (Abstract submitted for February Southern Section Meeting).

Luckett, R. L., E. A. Icaza, T. D. Bidner and A. C. Boston. 1975. Beef tenderness and its relation to carcass traits and pH. J. Anim. Sci. (Abstract submitted for February Southern Section Meeting).

Luckett, R. L., T. D. Bidner, E. A. Icaza and J. W. Turner. 1975. Tenderness studies in straightbred and crossbred steers. J. Anim. Sci. (Accepted for March publication).

VIII. PUBLICATIONS PLANNED:

Boston, Andrew C. 1975. Comparisons of reciprocal F_1 beef cows. J. Anim. Sci. (Abstract to be submitted for July National ASAS Meeting).

Boston, Andrew C. 1976. Back- and three-breed cross beef female productivity and maternal heterosis. 16th Livestock Producers' Day Report, Anim. Science Dept., L.S.U., Baton Rouge.

TABLE 1. REPRODUCTION OF STRAIGHTBRED AND TWO-BREED FIRST (F_1) CROSS COWS BY BREEDING LINE AND MATING TYPE, 1970-1973[a]

Breeding line and mating type	Pregnancy loss[b] %	Stillbirth[c] %	Live birth loss %	Total loss[d] %	Exposed cows No.	Pregnant[e] %	Calving %	Weaning %
Straightbred								
Angus (A)	4±1	6±2	6±2	15±3	133	83±3	79±3	71±4
Brahman (B)	6±2	5±2	5±3	15±3	121	70±3	66±3	59±4
Charolais (C)	4±2	4±2	9±3	15±4	128	78±4	76±4	66±4	
Hereford (H)	1±2	8±2	6±2	15±3	107	78±3	77±4	66±4
Mean[g]	4±2	6±1	6±1	15±2	489	77±2	74±2	66±2
Backcross								
A♂-AB♀	4±2	4±2	4±3	11±3	100	88±4	84±4	79±4
H♂-HB♀	0	2±2	3±2	4±3	109	94±3	94±3	90±4
C♂-CB♀	1±2	0	9±2	9±2	113	89±3	88±3	81±4
Mean[g]	1±1	2±1	5±1	8±2	322	90±2	89±2	83±2
Three-breed								
H♂-AB♀	7±2	2±2	1±3	10±3	101	90±4	84±4	81±4
C♂-AB♀	3±2	4±2	5±2	12±3	102	87±4	84±4	76±4
C♂-HB♀	0	2±2	5±2	6±3	110	88±3	88±3	83±2
A♂-HB♀	1±1	2±2	0	2±3	123	97±3	96±3	94±4
Mean[g]	3±1	2±1	3±1	8±2	436	90±2	88±2	84±2
Crossbred mean	2±1	2±1	4±1	8±1	758	90±1	88±1	83±2
Overall mean	3±1	3±1	5±1	10±1	1247	86±1	83±1	77±1

[a]Least squares mean ± standard error.
[b]Palpated pregnant cow not giving full-term birth.
[c]Of all calves born.
[d]Palpated pregnant cow not weaning a calf.
[e]Palpation 60 days after breeding season.
[f]All calves born, dead or alive.
[g]Mating type average.

TABLE 2. PREWEANING PERFORMANCE OF STRAIGHTBRED, BACKCROSS AND THREE-BREED CROSS CALVES BY BREEDING LINE AND MATING TYPE, 1970-1973[a]

Breeding line and mating type	Birth				Weaning				
						ADG[c]	Graded		Wt.
	No.	Date[b]	Wt., lb.	Percent assisted	No.	lb.	Condition	Conformation	lb.
Straightbred									
Angus (A)	109	44±2	60±1	1.3±1.4	99	1.51±.02	10.1±.1	11.0±.1	408±5
Brahman (B)	76	64±2	59±1	1.9±2.1	67	1.73±.03	9.9±.1	11.0±.1	457±8
Charolais (C)	98	48±2	78±1	4.7±1.8	87	2.00±.03	9.9±.1	12.1±.1	538±6
Hereford (H)	82	50±2	67±1	8.5±1.6	71	1.50±.02	10.0±.1	11.0±.1	415±6
Mean[e]	365	52±1	66±1	4.1±0.8	324	1.68±.01	10.0±.1	11.3±.1	455±3
Backcross[f]									
A^3B^1	86	44±2	59±1	2.2±1.7	81	1.84±.02	10.7±.1	11.5±.1	482±6
H^3B^1	101	45±2	68±1	1.1±1.5	97	1.93±.02	11.0±.1	11.7±.1	510±5
C^3B^1	98	47±2	71±1	0.1±1.5	89	2.08±.02	10.1±.1	11.8±.1	551±6
Mean[e]	285	45±1	66±1	1.1±0.9	267	1.95±.01	10.6±.1	11.6±.1	514±3
Three-breed[f]									
$H^2A^1B^1$	88	43±2	68±1	0.5±1.7	85	1.91±.02	10.9±.1	11.7±.1	508±6
$C^2A^1B^1$	87	39±2	67±1	1.0±1.7	78	1.98±.02	10.1±.1	11.8±.1	524±6
$C^2H^1B^1$	95	43±2	74±1	3.4±1.5	90	2.15±.02	10.5±.1	12.1±.1	570±6
$A^2H^1B^1$	117	43±2	64±1	0.2±1.3	115	1.95±.02	11.0±.1	11.7±.1	512±5
Mean[e]	387	42±1	68±1	1.3±0.8	368	2.00±.01	10.7±.1	11.8±.1	528±3
Crossbred mean	672	43±1	67±1	1.2±0.6	635	1.98±.01	10.6±.1	11.7±.1	522±2
Overall mean	1037	46±1	67±1	2.3±0.1	959	1.87±.01	10.4±.1	11.6±.1	498±2

[a]Least squares mean ± standard error.
[b]Day of the year.
[c]Average daily gain birth to weaning.
[d]10 denotes average good grade with each unit of change referring to 1/3 of a grade.
[e]Mating type average.
[f]A^3B^1 means 3/4 Angus and 1/4 Brahman.

TABLE 3. PRODUCTIVITY AND EFFICIENCY OF STRAIGHTBRED AND TWO-BREED FIRST (F_1) CROSS COWS BY BREEDING LINE AND MATING TYPE, 1970-1973[a]

Breeding line and mating type	Cow weight		Pounds weaning weight per cow exposed		Pounds weaning weight per 100 lb. cow exposed	
	Lb.[b]	Percent weaned[c]	Adjusted[d]	Unadjusted[d]	Adjusted[d]	Unadjusted[d]
Straightbred						
Angus (A)	950±11	43±1	304±4	306±5	32±1	32±1
Brahman (B)	992±16	47±1	254±6	237±6	26±1	24±1
Charolais (C)	1191±13	46±1	366±5	364±6	31±1	31±1
Hereford (H)	1009±12	41±1	277±5	271±6	28±1	27±1
Mean[e]	1035±6	44±1	300±2	294±3	29±1	29±1
Backcross						
A♂-AB♀	1000±12	49±1	393±5	395±6	40±1	40±1
H♂-HB♀	1107±10	46±1	455±4	456±5	41±1	42±1
C♂-CB♀	1202±11	46±1	434±4	432±5	36±1	36±1
Mean[e]	1103±7	47±1	427±3	428±3	39±1	39±1
Three-breed						
H♂-AB♀	1009±12	50±1	421±5	425±6	42±1	42±1
C♂-AB♀	991±12	53±1	401±5	411±6	41±1	42±1
C♂-HB♀	1123±11	51±1	466±5	471±5	42±1	42±1
A♂-HB♀	1088±9	47±1	480±4	484±4	44±1	45±1
Mean[e]	1053±6	51±1	440±2	448±3	42±1	43±1
Crossbred mean	1074±4	49±1	435±2	439±2	41±1	41±1
Overall mean	1060±3	47±1	386±1	387±1	37±1	37±1

[a]Least squares mean ± standard error.
[b]Average of January, April, July and October weights.
[c]For only cows weaning calves.
[d]For birth date differences.
[e]Mating type average.

TABLE 4. REPRODUCTION OF RECIPROCAL TWO-BREED FIRST (F_1) CROSS COWS BY COW BREED, 1970-1973[a,g]

Cow parental breeds[h]	Pregnancy loss[b] %	Stillbirth[c] %	Live birth loss %	Total loss[d] %	Exposed cows No.	Pregnant[e] %	Calving[f] %	Weaning %
A♂-B♀	7±2	5±2	3±3	15±3	131	90±4	83±4	76±4
B♂-A♀	2±1	1±1	4±2	7±2	172	87±3	85±3	81±3
AB + BA mean	5±1	3±1	4±2	11±2	303	88±2	84±2	79±3
H♂-B♀	0	1±1	2±2	2±2	168	92±3	92±3	90±3
B♂-H♀	1±1	3±1	3±2	6±2	174	93±3	93±3	88±3
HB + BH mean	0	2±1	3±1	4±2	342	93±2	93±2	89±2

[a,b,c,d,e,f]See table 1 footnotes.

[g]All cow breeds were mated to the same three bull breeds to produce both backcross and three-breed cross calves (see table 1).

[h]Angus (A), Brahman (B) and Hereford (H).

TABLE 5. PREWEANING PERFORMANCE OF CALVES OF RECIPROCAL TWO-BREED FIRST (F_1) CROSS COWS BY COW BREED, 1970-1973[a,g]

Cow parental breeds[h]	Birth				Weaning				
						ADG[c]	Grade[d]		
	No.	Date[b]	Wt. lb.	Percent assisted	No.	lb.	Condition	Conformation	Wt. lb.
A♂-B♀	113	38±2	63±1	1.9±1.7	103	1.88±.02	10.5±.1	11.5±.1	495±6
B♂-A♀	148	46±2	67±1	0.6±1.2	141	1.95±.02	10.7±.1	11.7±.1	515±4
AB + BA mean	261	42±1	65±1	1.2±1.0	244	1.91±.01	10.6±.1	11.6±.1	505±4
H♂-B♀	152	42±2	68±1	2.1±1.2	148	1.96±.02	10.7±.1	11.7±.1	519±4
B♂-H♀	161	45±1	69±1	1.1±1.2	154	2.05±.02	11.0±.1	11.9±.1	542±4
HB + BH mean	313	43±1	69±1	1.6±0.8	302	2.01±.01	10.9±.1	11.8±.1	531±3

[a,b,c,d]See table 2 footnotes.
[g,h]See table 4 footnotes.

TABLE 6. PRODUCTIVITY AND EFFICIENCY OF RECIPROCAL TWO-BREED FIRST (F_1) CROSS COWS BY COW BREED, 1970-1973[a,g]

Cow parental breeds[h]	Cow weight		Pounds weaning weight per cow exposed		Pounds weaning weight per 100 lb. cow exposed	
	Lb.[b]	Percent weaned[c]	Adjusted[d]	Unadjusted[d]	Adjusted[d]	Unadjusted[d]
A♂-B♀	959±12	52±1	389±5	401±6	41±1	42±1
B♂-A♀	1041±9	50±1	421±3	420±4	41±1	41±1
AB + BA mean	1000±7	51±1	405±3	410±3	41±1	41±1
H♂-B♀	1119±9	47±1	456±3	461±4	41±1	42±1
B♂-H♀	1092±9	50±1	477±3	480±4	44±1	44±1
HB + BH mean	1106±6	48±1	467±2	471±3	43±1	43±1

[a,b,c,d]See table 3 footnotes.
[g,h]See table 4 footnotes.

TABLE 7. POSTWEANING PERFORMANCE OF STRAIGHTBRED, BACKCROSS AND THREE-BREED CROSS STEERS BY BREEDING LINE AND MATING TYPE, 1970-1973[a]

Breeding line and mating type	No.	Weaning weight lb.	ADG[b] lb.	Final weight lb.	Final WPDA lb.	Final live weight		
						Cow wt.[c] percent	Exposed cow[d] pounds	100# exposed cow[d], pounds
Straightbred								
Angus (A)	49	428±8	1.79±.04	855±15	1.92±.03	90±1	665±12	70±1
Brahman (B)	30	484±11	1.60±.06	832±20	1.86±.04	84±2	408±15	41±2
Charolais (C)	40	566±11	2.06±.06	1030±19	2.31±.04	87±2	643±15	56±2
Hereford (H)	31	422±8	1.70±.05	830±16	1.86±.04	84±2	531±13	54±2
Mean[e]	150	475±5	1.78±.03	886±8	1.99±.02	87±1	562±7	55±1
Backcross[f]								
A^3B^1	40	501±8	1.78±.05	906±15	2.03±.03	90±2	729±12	72±1
H^3B^1	51	535±7	1.77±.04	923±13	2.07±.03	83±2	825±10	75±1
C^3B^1	34	571±9	1.82±.05	968±17	2.17±.04	80±2	654±13	54±2
Mean[e]	125	536±5	1.79±.03	932±8	2.09±.02	84±1	736±7	67±1
Three-breed[f]								
$H^2A^1B^1$	51	526±8	1.84±.05	938±14	2.10±.03	94±2	780±11	77±1
$C^2A^1B^1$	43	542±8	1.89±.05	964±15	2.16±.03	98±2	735±12	75±1
$C^2H^1B^1$	34	599±9	1.92±.05	1005±17	2.25±.04	91±2	701±14	64±2
$A^2H^1B^1$	58	535±6	1.93±.04	958±12	2.14±.03	87±1	883±9	81±1
Mean[e]	186	550±4	1.89±.02	966±7	2.16±.02	93±1	774±6	74±1
Crossbred mean	311	544±3	1.85±.02	952±6	2.13±.01	90±1	758±4	71±1
Overall mean	461	519±2	1.82±.01	928±4	2.07±.01	88±1	687±3	65±1

[a,e,f]See table 2 footnotes.
[b]Average Daily Gain weaning to slaughter.
[c]Based on only dams of steers with final live weight and the cow weight for year steer was born.
[d]Assumes a 1 to 1 calf sex ratio with steers supporting their dams plus 1/2 those not weaning a calf.

TABLE 8. CARCASS CHARACTERISTICS OF STRAIGHTBRED, BACKCROSS AND THREE-BREED CROSS STEERS BY BREEDING LINE AND MATING TYPE, 1970-1973[a]

Breeding line and mating type	No.	Hot weight lb.	WPDA[b] lb.	Grade		Backfat in.	Ribeye area in.^{2}	Tender-ness[c]	Carcass weight	
				Quality[d]	Yield				Exposed cow[g], lb.	100# exposed cow[g], lb.
Straightbred										
Angus (A)	48	523±10	1.15±.02	10.8±.2	3.3±.1	0.48±.03	9.5±.2	19.9±0.8	407±8	43±1
Brahman (B)	30	514±13	1.13±.03	8.8±.3	2.7±.1	0.24±.03	8.9±.3	26.7±1.0	252±10	25±1
Charolais (C)	40	638±13	1.41±.03	9.6±.3	2.2±.1	0.23±.03	12.1±.3	19.6±1.0	399±10	34±1
Hereford (H)	31	500±11	1.10±.03	9.8±.2	2.9±.1	0.41±.03	9.5±.2	20.0±0.8	320±8	32±1
Mean[e]	149	544±6	1.20±.01	9.8±.1	2.8±.1	0.34±.01	10.0±.1	21.5±0.4	344±4	34±1
Backcross[f]										
A^3B^1	40	556±10	1.23±.02	10.0±.2	3.4±.1	0.49±.02	9.4±.2	20.4±0.8	448±8	44±1
H^3B^1	51	564±8	1.24±.02	9.4±.2	3.2±.1	0.42±.02	9.8±.2	20.1±0.6	504±6	46±1
C^3B^1	33	611±12	1.35±.03	9.2±.3	2.4±.1	0.23±.03	11.2±.3	19.5±0.9	400±9	33±1
Mean[e]	124	577±6	1.27±.01	9.5±.1	3.0±.1	0.38±.01	10.1±.1	20.0±0.4	451±5	41±1
Three-breed[f]										
$H^2A^1B^1$	50	579±10	1.27±.02	10.0±.2	3.4±.1	0.47±.02	9.9±.2	20.7±0.7	473±7	47±1
$C^2A^1B^1$	43	597±10	1.32±.02	9.8±.2	2.7±.1	0.30±.02	10.5±.2	20.4±0.8	455±8	46±1
$C^2H^1B^1$	33	628±12	1.38±.03	9.2±.3	2.8±.1	0.29±.03	10.7±.3	20.4±0.9	424±9	39±1
$A^2H^1B^1$	58	599±8	1.32±.02	10.2±.2	3.4±.1	0.48±.02	9.7±.2	20.1±0.6	551±6	50±1
Mean[e]	184	601±5	1.32±.01	9.8±.1	3.1±.1	0.39±.01	10.2±.1	20.4±0.4	476±4	46±1
Crossbred mean	308	590±4	1.30±.01	9.7±.1	3.0±.1	0.38±.01	10.1±.1	20.2±0.3	465±3	43±1
Overall mean	457	573±3	1.26±.01	9.7±.1	2.9±.1	0.37±.01	10.1 .1	20.7±0.2	421±2	40±1

[a,d,e,f] See table 2 footnotes.
[b] Weight per day of age.
[c] Warner-Bratzler shear values. Lower values imply more tenderness.
[g] See footnote d of table 7.

TABLE 9. POSTWEANING PERFORMANCE OF STEER PROGENY OF RECIPROCAL TWO-BREED FIRST (F_1) CROSS COWS BY COW BREED, 1970-1973[a,g]

Cow parental breeds[h]	No.	Weaning weight lb.	ADG[b] lb.	Final weight lb.	Final WPDA lb.	Final live weight		
						Cow wt.[c] percent	Exposed cow[d] pounds	100# exposed cow[d], pounds
A♂-B♀	62	506±8	1.81±.05	911±14	2.04±.03	96±2	696±11	73±1
B♂-A♀	72	540±6	1.86±.04	961±11	2.15±.03	92±1	799±9	76±1
AB + BA mean	134	523±5	1.83±.03	936±9	2.10±.02	94±1	748±7	75±1
H♂-B♀	70	546±6	1.86±.04	953±12	2.13±.03	86±1	789±9	71±1
B♂-H♀	73	567±7	1.89±.04	971±13	2.18±.03	88±2	816±10	74±1
HB + BH mean	143	556±5	1.87±.03	962±8	2.15±.02	87±1	803±7	73±1

[a,b,c,d]See table 7 footnotes.
[g,h]See table 4 footnotes.

TABLE 10. CARCASS CHARACTERISTICS OF STEER PROGENY OF RECIPROCAL TWO-BREED FIRST (F_1) CROSS COWS BY COW BREED, 1970-1973[a,g]

Cow parental breeds[h]	No.	Weight lb.	WPDA[b] lb.	Quality[d]	Yield	Backfat in.	Ribeye area in.^{2}	Tender-ness[c]	Carcass weight	
									Exposed cow[d], lb.	100# exposed cow[d], lb.
A♂-B♀	62	561±9	1.24±.02	9.8±.2	3.0±.1	0.40±.02	10.0±.2	20.4±.7	428±7	45±1
B♂-A♀	71	594±8	1.31±.02	10.1±.2	3.3±.1	0.44±.02	9.8±.2	20.6±.6	488±6	47±1
AB + BA mean	133	577±6	1.27±.01	9.9±.1	3.2±.1	0.42±.01	9.9±.1	20.5±.5	458±5	46±1
H♂-B♀	70	591±8	1.30±.02	9.5±.2	3.2±.1	0.41±.01	9.9±.2	20.3±.6	489±6	44±1
B♂-H♀	72	602±9	1.33±.02	9.6±.2	3.1±.1	0.38±.02	10.3±.2	20.1±.7	497±7	45±1
HB + BH mean	142	597±6	1.32±.01	9.6±.1	3.1±.1	0.40±.01	10.1±.1	20.2±.4	493±4	45±1

[a,b,c,d]See table 8 footnotes.
[g,h]See table 4 footnotes.

TABLE 11. POSTWEANING DEVELOPMENT OF STRAIGHTBRED, BACKCROSS AND THREE-BREED CROSS REPLACEMENT HEIFERS BY BREEDING LINE AND MATING TYPE, 1970-1973[a]

Breeding line and mating type	No.	Weight, lb.			Pounds ADG weaning to		Weight per day of age, lb.		Lb. weight/100 pounds dam wt.[c]	
		Weaning	14 mo.[b]	20 mo.[b]	14 mo.[b]	20 mo.[b]	14 mo.[b]	20 mo.[b]	14 mo.[b]	20 mo.[b]
Straightbred										
Angus (A)	46	399±7	536±9	689±10	0.75±.03	0.80±.02	1.30±.02	1.16±.02	57±1	73±1
Brahman (B)	28	436±12	513±14	726±16	0.42±.05	0.80±.03	1.24±.03	1.22±.03	52±2	73±1
Charolais (C)	46	515±8	609±9	840±11	0.51±.04	0.89±.02	1.47±.02	1.41±.02	52±1	72±1
Hereford (H)	37	408±8	535±10	705±11	0.69±.04	0.82±.02	1.29±.02	1.18±.02	53±1	70±1
Mean[e]	157	440±4	548±5	740±6	0.59±.02	0.83±.01	1.32±.05	1.24±.01	53±1	72±1
Backcross[f]										
A^3B^1	40	462±10	563±12	740±13	0.55±.05	0.77±.03	1.36±.03	1.24±.02	57±1	75±2
H^3B^1	45	491±7	585±9	776±10	0.51±.04	0.78±.02	1.41±.02	1.30±.02	54±1	71±1
C^3B^1	46	530±7	626±9	846±10	0.53±.03	0.87±.02	1.51±.02	1.42±.02	53±1	71±1
Mean[e]	131	494±5	591±6	788±6	0.53±.02	0.81±.01	1.43±.01	1.32±.01	54±1	73±1
Three-breed[f]										
$H^2A^1B^1$	33	487±9	600±11	791±13	0.62±.04	0.84±.02	1.45±.03	1.33±.02	59±1	78±1
$C^2A^1B^1$	33	518±10	633±12	864±13	0.63±.05	0.95±.03	1.53±.03	1.45±.02	63±1	86±2
$C^2H^1B^1$	49	548±7	645±9	867±10	0.53±.03	0.88±.02	1.55±.02	1.46±.02	57±1	77±1
$A^2H^1B^1$	48	495±7	614±9	818±10	0.65±.03	0.89±.02	1.48±.02	1.37±.02	58±1	77±1
Mean[e]	163	512±4	623±5	835±6	0.61±.02	0.89±.01	1.50±.01	1.40±.01	59±1	79±1
Crossbred mean	294	504±3	609±4	815±4	0.57±.02	0.85±.01	1.47±.01	1.37±.01	57±1	76±1
Overall mean	451	481±2	587±3	787±3	0.58±.01	0.84±.01	1.42±.01	1.32±.01	56±1	75±1

a,e,f See table 2 footnotes.

[b] Average ages when weighed in April (14 mo.) and October (20 mo.) following weaning.

[c] Dam weight for year heifer was born.

TABLE 12. POSTWEANING DEVELOPMENT OF REPLACEMENT HEIFER PROGENY OF RECIPROCAL TWO-BREED FIRST (F_1) CROSS COWS BY COW BREED, 1970-1973[a,g]

Cow parental breeds[h]	No.	Weight, lb.			Pounds ADG weaning to		Weight per day of age, lb.		Lb. weight/100 pounds dam wt.[c]	
		Weaning	14 mo.[b]	20 mo.[b]	14 mo.[b]	20 mo.[b]	14 mo.[b]	20 mo.[b]	14 mo.[b]	20 mo.[b]
A♂-B♀	39	484±10	592±12	790±14	0.59±.04	0.84±.03	1.43±.03	1.33±.02	60±1	80±2
B♂-A♀	67	494±6	606±8	807±9	0.61±.03	0.86±.02	1.46±.02	1.35±.02	59±1	79±1
AB + BA mean	106	489±6	599±7	798±8	0.60±.03	0.85±.02	1.45±.02	1.34±.01	60±1	80±1
H♂-B♀	71	501±5	604±7	808±8	0.56±.03	0.84±.02	1.46±.02	1.36±.01	54±1	73±1
B♂-H♀	71	522±6	625±7	833±8	0.56±.03	0.85±.02	1.51±.02	1.40±.01	58±1	77±1
HB + BH mean	142	512±4	614±5	820±6	0.56±.02	0.85±.01	1.48±.01	1.38±.01	56±1	75±1

[a,b,c]See table 11 footnotes.
[g,h]See table 4 footnotes.

TABLE 13. 1974 UNADJUSTED CONCEPTION RATES, BASED ON PALPATION 60-DAYS POSTBREEDING OF THE PHASE II DAMS BY BREEDING LINE AND MATING TYPE

Breeding line and mating type	Year of dam birth								Total	
	1970		1971		1972		1973			
	No.[a]	%	No.[a]	%	No.[a]	%	No.[a]	%	No.[a]	%
Straightbred										
Angus (A)	8/9	88.9	3/8	37.5	5/8	62.5	6/8	75.0	22/33	66.7
Brahman (B)	6/9	66.7	12/16	75.0	1/5	20.0	1/3	33.3	20/33	60.6
Charolais (C)	4/5	80.0	7/11	63.6	3/6	50.0	6/9	66.7	20/31	64.5
Hereford (H)	4/4	100.0	5/9	55.6	7/8	87.5	5/11	45.5	21/32	65.6
Mean	22/27	81.5	27/44	61.4	16/27	59.3	18/31	58.1	83/129	64.3
Backcross[b]										
$A^{3}B^{1}$♀-B♂	8/10	80.0	6/10	60.0	6/9	66.7	1/4	25.0	21/33	63.6
$H^{3}B^{1}$♀-B♂	9/11	81.8	6/7	85.7	6/8	75.0	6/8	75.0	27/34	79.4
$C^{3}B^{1}$♀-B♂	7/8	87.5	7.9	77.8	5/7	71.4	6/8	75.0	25/32	78.1
Mean	24/29	82.8	19/26	73.1	17/24	70.8	13/20	65.0	73.99	73.7
Three-breed[b]										
$C^{2}A^{1}B^{1}$♀-A♂	8/9	88.9	4/5	80.0	8/10	80.0	4/7	57.1	24/31	77.4
$C^{2}H^{1}B^{1}$♀-H♂	9/9	100.0	8/9	88.9	7/7	100.0	7/8	87.5	31/33	93.9
$A^{2}H^{1}B^{1}$♀-H♂	10/10	100.0	7/8	87.5	6/7	85.7	8/8	100.0	31/33	93.9
Mean	27/28	96.4	19/22	86.4	21/24	87.5	19/23	82.6	86/97	88.7
Four-breed[b]										
$H^{2}A^{1}B^{1}$♀-C♂	6/7	85.7	5/8	62.5	5/7	71.4	6/11	54.5	22/33	66.7
Crossbred mean	57/64	89.1	43/56	76.8	43/55	78.2	38/54	70.4	181/229	79.0
Overall Mean	79/91	86.8	70/100	70.0	59/82	72.0	56/85	65.9	264/358	73.7

[a]Number palpated pregnant and number exposed.

[b]$A^{3}B^{1}$ mean 3/4 Angus and 1/4 Brahman dam. The breeding of the dam and the bull she was mated to are both given for the crossbred lines.

Production, Inventory and Performance Data, S-10 Herds - 1974

State Louisiana

Location		Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of sire		Angus	Angus	Charolais	Hereford	Brahman
Breed of dam		Angus	A x B	A x B	A x B	Brahman
Line or group[1]		1	5	8	11	2
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1974	Cows 2 years and over	33	13	14	12	32
	Yearling heifers	--	--	--	--	--
	Bulls and steers under 1 year	--	--	--	--	--
	Heifers under 1 year	--	--	--	--	--
	Bulls over 1 year	2	--	--	--	7
	Steers over 1 year	--	--	--	--	--
Repro. perf.	Percent pregnant[2]					
	Calf survival percent[3]					
Wean. perf.	Adj. ADG[4]					
	Ave. type sc.[5]					
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system· indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1974

State Louisiana

Location		Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of sire		Angus	Charolais	Hereford	Angus	Charolais
Breed of dam		B x A	B x A	B x A	B x H	B x H
Line or group[1]		5	8	11	9	10
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1974	Cows 2 years and over	21	18	20	17	17
	Yearling heifers	--	--	--	--	--
	Bulls and steers under 1 year	--	--	--	--	--
	Heifers under 1 year	--	--	--	--	--
	Bulls over 1 year	--	--	--	--	--
	Steers over 1 year	--	--	--	--	--
Repro. perf.	Percent pregnant[2]					
	Calf survival percent[3]					
Wean. perf.	Adj. ADG[4]					
	Ave. type sc.[5]					
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					

Remarks

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system indicate if different.

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Production, Inventory and Performance Data, S-10 Herds - 1974

State Louisiana

Location		Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge
Breed of sire		Hereford	Charolais	Charolais	Hereford	Angus
Breed of dam		B x H	Charolais	C x B	Hereford	H x B
Line or group[1]		7	3	6	4	9
Percent used in project		100	100	100	100	100
Inventory as of December 31, 1974	Cows 2 years and over	17	33	33	32	17
	Yearling heifers	--	--	--	--	--
	Bulls and steers under 1 year	--	--	--	--	--
	Heifers under 1 year	--	--	--	--	--
	Bulls over 1 year	--	3	--	5	--
	Steers over 1 year	--	--	--	--	--
Repro. perf.	Percent pregnant[2]					
	Calf survival percent[3]					
Wean. perf.	Adj. ADG[4]					
	Ave. type sc.[5]					
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system: indicate if different.

S-10-1 (Rev.)

Production, Inventory and Performance Data, S-10 Herds - 1974

State Louisiana

Location		Baton Rouge	Baton Rouge		Baton Rouge	
Breed of sire		Charolais	Hereford			
Breed of dam		H x B	H x B		TOTALS	
Line or group[1]		10	7			
Percent used in project		100	100		100	
Inventory as of December 31, 1974	Cows 2 years and over	17	17		363	
	Yearling heifers	--	--		--	
	Bulls and steers under 1 year	--	--		--	
	Heifers under 1 year	--	--		--	
	Bulls over 1 year	--	--		17	
	Steers over 1 year	--	--		--	
Repro. perf.	Percent pregnant[2]	--	--		--	
	Calf survival percent[3]					
Wean. perf.	Adj. ADG[4]					
	Ave. type sc.[5]					
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments.

[5]Suggest S-10 scoring system indicate if different.

S-10-1 (Rev.)

IBERIA LIVESTOCK EXPERIMENT STATION
Jeanerette, Louisiana

I. PROJECT: 03-30-002-19-06 (Revision No. 2)

Selection for adaptability of beef cattle to the Gulf Coast Area.

II. OBJECTIVES:

1. To determine if changes in adaptation and performance of Angus cattle can be made by selection of the best available bulls from within the herd or by selection of the best available bulls from outside the area.

2. To develop techniques which better estimate the overall merit of beef cattle.

III. PERSONNEL:

T. M. DeRouen, D. C. Meyerhoeffer, W. L. Reynolds, R. A. Harpel, N. T. Poche' and B. P. Buteau, Jeanerette, Louisiana
T. D. Bidner, Baton Rouge, Louisiana
Will T. Butts, Jr., Knoxville, Tennessee

IV. ACCOMPLISHMENTS DURING THE YEAR:

1. Scope and nature of work:

Adaptability studies in the Gulf Coast region have been primarily concerned with crossing Brahman and British beef breeds as a means of improving performance. The Iberia Station initiated a study to find out how much improvement in adaptability and performance can be made in Angus cattle by selection in this environment. Procedures were to evaluate the changes in adaptation and performance of Angus cattle by selecting the best bulls from within the herd (closed line) or by selection of the best available bulls from outside (open line) the area. All bulls selected from outside the Gulf Coast area were certified meat sires.

2. Research results:

Results showed that weaning weights were similar between progeny of bulls selected within the herd (closed line) and those of bulls from outside the Gulf Coast area (open line) (table 1).

Postweaning daily gains of bull calves on full feed have been consistently greater for those from outside sires. However, final weights at one year of age of bull calves from the open line and the closed line were similar (table 2). Carcass data showed that closed line bull carcasses had less fat and a higher dressing percent than carcasses of open line bulls (table 3). Shear values showed that lean of open line bull carcasses was more tender than lean of carcasses of closed line bulls. Other carcass traits were similar between lines (table 3).

V. PUBLICATIONS:

DeRouen, T. M., W. L. Reynolds, D. C. Meyerhoeffer, R. A. Harpel, N. T. Poche' and T. D. Bidner. Selection for adaptability of beef cattle in the Gulf Coast area. Fourteenth Livestock Producers' Day Report. Jan. 1974.

DeRouen, T. M., W. L. Reynolds, R. A. Harpel, D. C. Meyerhoeffer, and N. T. Poche'. Biuret for wintering replacement heifers in the Gulf Coast area. Fourteenth Livestock Producers' Day Report. Jan. 1974.

Humes, Paul E., T. M. DeRouen and Emilo A. Icaza. A comparison of two pasture programs for developing replacement heifers. Fourteenth Livestock Producers' Day Report. Jan. 1974.

Reynolds, W. L., T. M. DeRouen, R. A. Harpel, D. C. Meyerhoeffer and N. T. Poche'. Performance of lactating cows on different treatments in drylot or on pasture. Fourteenth Livestock Producers' Day Report. Jan. 1974.

Reynolds, W. L., T. M. DeRouen, R. A. Harpel, N. T. Poche' and T. W. White. Beef cows in confinement. La. Cattleman, vol.7, no. 2, p. 8. Feb. 1974.

TABLE 1. COW PRODUCTION 1973

Breed Study Line	Angus Adaptability Closed	Angus Adaptability Open[a]
No. cows exposed	64	31
No. calves born[b]	49	26
Avg. birth wt., lb.	59	57
No. calves weaned	44	23
% calves weaned	90	88
Avg. wean. age, days	227	220
Actual wean. wt., lb.	361	358
Adj. 205-day wean. wt., lb.[c]	355	354
Adj. wean. ADG, lb.[c]	1.44	1.45
Scores:[d]		
Conformation	11.8	11.7
Condition	8.3	8.6
Fat thickness,mm	--	--
Index[e]	108	108

[a]Artificially inseminated.
[b]Includes live & dead calves.
[c]Adjusted for sex of calf & age of dam.
[d]Avg. good = 10; avg. standard = 7.
[e]Equal emphasis to growth and to conformation.

TABLE 2. POSTWEANING PERFORMANCE OF BULLS FED IN 1973-74

Breed Study Line	Angus Adaptability Closed	Angus Adaptability Open
No. fed	20	11
Init. wt., lb.	382	346
No. days fed	140	149
Final wt., lb.	690[a]	681[a]
Daily gain on test, lb.	2.18	2.25
Age at end of test, days	365	365
Scores:[b]		
Type score	12.3	12.0
Condition score	10.2	10.5
% Inbreeding	1.98	--
Index	104	103
Wt/day of age	1.89	1.87

[a]Each bull weighed at a constant age of 365 days.
[b]Avg. choice = 13; avg. good = 10.

TABLE 3. CARCASS DATA OF BULLS 1973-74

Breed Study Line	Angus Adaptability Closed	Angus Adaptability Open
No. slaughtered	11	9
Final wt., lb.[a]	775	768
Slaughter age, days	432	419
Days fed	208	208
Avg. daily gain, lb.	1.94	2.11
Slaughter scores:[b]		
Conformation	12.4	11.8
Condition	9.8	10.1
Carcass wt.,lb.	481	466
Dressing %	62.1	60.8
Carcass grades:[b]		
Conformation	13.0	12.9
Composite	10.0	10.0
Yield	1.76	2.04
Marbling[c]	7.1	6.8
Kidney fat %[c]	1.64	1.78
Ribeye area, sq. in.	10.6	10.0
Ribeye area/100 lb. carcass	2.21	2.15
Shear 1" core	22.71	22.61
Fat thickness, mm[d]	6.8	7.5
Fat thickness, in.[d]	0.27	0.30
Carcass wt./day of age	1.11	1.12

[a]Wt. at end of test.
[b]Avg. standard = 7; avg. good = 10; avg. choice = 13.
[c]Estimated by grader.
[d]Measured at one place on ribeye tracing.

I. PROJECT: 03-30-002-19-06

Selection for changes in fatness in beef cattle.

II. OBJECTIVES:

1. To determine if changes in fat thickness of Angus and Brangus cattle can be made by selection in opposite directions for fatness--high fat and low fat.

2. To estimate genetic and environmental relationships of fatness or leanness with other performance and carcass traits.

3. To develop techniques which better estimate the overall merit of beef cattle.

III. PERSONNEL:

T. M. DeRouen, D. C. Meyerhoeffer, W. L. Reynolds, R.A. Harpel, N. T. Poche' and B. P. Buteau, Jeanerette, Louisiana
T. D. Bidner, Baton Rouge, Louisiana
Will T. Butts, Jr., Knoxville, Tennessee

IV. ACCOMPLISHMENTS DURING THE YEAR:

1. Scope and nature of work:

Emphasis on selection of beef cattle with less external fat and more lean is given considerable attention by progressive cattlemen. This investigation was initiated to study the practicability of selecting for low fat and high fat in each of two breeds. The relationship of other economic traits to this type of selection were evaluated. Angus and Brangus cattle were used in this project.

2. Research results:

Results of selection for low and high fat showed that weaning fat thickness over the ribs, measured ultrasonically, was similar for low and high fat Brangus calves, while Angus calves had fat thicknesses of 0.3 mm and 0.8 mm for low and high fat lines, respectively. Adjusted 205-day weaning weights between lines within breeds were similar (table 1).

Postweaning fat thickness of bull calves measured at a constant weight of 800 lbs showed that high fat Brangus bull calves had 2.7 mm of fat over the ribs and low fat Brangus bull calves had 2.3 mm. Angus bull calves had fat thicknesses of 4.1 mm and 3.2 mm, respectively, for high and low fat lines. Postweaning average daily gain of Brangus bull calves was similar between lines while low fat Angus bull calves grew slightly faster (0.17 lb) than high fat Angus bull calves (table 2).

Carcass data showed that high fat Brangus bulls had slightly more fat than low fat Brangus bulls while tenderness, ribeye areas, dressing percent, and composite grade were similar between lines. High fat Angus bulls also had carcasses with more fat than low fat Angus bulls. Other carcass measurements of Angus bulls were similar between lines (table 3).

V. PUBLICATIONS:

DeRouen, T. M., D. C. Meyerhoeffer, W. L. Reynolds, R. A. Harpel, N. T. Poche' and T. D. Bidner. Selection for changes in fatness in beef cattle. Fourteenth Livestock Producers' Day Report. Jan. 1974.

Reynolds, W. L., T. M. DeRouen, D. C. Meyerhoeffer, N. T. Poche' and R. A. Harpel. Wintering programs for weanling heifers. La. Cattleman, v. 7, no. 1, p. 26. Jan. 1974.

Reynolds, W. L., T. M. DeRouen, D. C. Meyerhoeffer and T. W. White. Supplementation of beef cows with ground or whole shelled corn. J. Ani. Sci. (abstr.) 1974.

DeRouen, T. M., W. L. Reynolds, D. C. Meyerhoeffer, R. A. Harpel and N. T. Poche'. Biuret for wintering beef heifers in the Gulf Coast area. La. Agri. Fall issue, 1974.

Reynolds, W. L., T. M. DeRouen, R. A. Harpel, D. C. Meyerhoeffer and N. T. Poche'. Performance of steers and heifers in the feedlot to high roughage and liquid protein supplement rations. Fourteenth Livestock Producers' Day Report. Jan. 1974.

Reynolds, W. L., T. M. DeRouen, R. A. Harpel, D. C. Meyerhoeffer, N. T. Poche' and T. W. White. Effect of feeding different silage, molasses-urea mix, ground or whole shelled corn to steers. Fourteenth Livestock Producers' Day Report. Jan. 1974.

TABLE 1. COW PRODUCTION 1973

Breed	Brangus		Angus	
Study	Fat		Fat	
Line	High	Low	High	Low
No. cows exposed	62	69	54	80
No. calves born[a]	39	38	37	62
Avg. birth wt., lb.	64	65	58	59
No. calves weaned	30	31[b]	34	52[c]
% calves weaned	77	82	92	84
Avg. wean. age, days	212	211	228	222
Actual wean. wt., lb.	394	400	362	346
Adj. 205-day wean. wt., lb.[d]	405	418	353	349
Adj. wean. ADG, lb.[d]	1.66	1.72	1.44	1.41
Scores:[e]				
Conformation	10.9	11.5	11.4	11.2
Condition	7.7	8.4	8.3	7.6
Fat thickness, mm	0.4	0.3	0.8	0.3
Index[f]	111	116	106	103

[a]Includes live & dead calves.
[b]One calf sold before weaned.
[c]One calf sold before weaned.
[d]Adjusted for sex of calf & age of dam.
[e]Avg. good = 10; avg. standard = 7.
[f]Equal emphasis to growth & to conformation.

TABLE 2. POSTWEANING PERFORMANCE OF BULLS FED IN 1973-74

Breed	Brangus		Angus	
Study Line	Fat High[a]	Fat Low[a]	Fat High	Fat Low[b]
No. fed	14	15	14	20
Initial wt., lb.	421	427	396	361
No. days fed	155	146	185	182
Final wt., lb.	798[c]	792[c]	800[c]	792[c]
Daily gain on test, lb.	2.44	2.48	2.19	2.36
Age at end of test, days	368	361	414	397
Scores:[d]				
Type score	11.6	11.2	12.8	11.8
Condition score	9.4	9.5	10.3	9.3
Fat thickness, mm[e]	2.7	2.3	4.-	3.2
Fat thickness, in.[e]	0.11	0.09	0.16	0.13
% Zebu	37.38	40.17	--	--
% Inbreeding	3.19	1.94	--	2.21
Wt./day of age	2.17	2.19	1.93	1.99

[a]One high fat and 2 low fat Brangus bulls did not reach 800 lb. at 400 days of age.
[b]Three low fat Angus bulls did not reach 800 lb. at 400 days of age.
[c]Each bull fed to a constant wt. of 800 lb.
[d]Avg. choice = 13; avg. good = 10.
[e]Measured when each bull weighed 800 lb.

TABLE 3. CARCASS DATA OF BULLS 1973-74

Breed	Brangus		Angus	
Study	Fat	Fat	Fat	Fat
Line	High	Low	High	Low
No. slaughtered	10	9	14	18
Final wt., lb.[a]	838	816	828	787
Slaughter age, days	423	416	458	449
Days fed	208	208	229	229
Avg. daily gain, lb.	2.05	1.93	1.89	1.93
Slaughter scores:[b]				
Conformation	11.0	10.9	12.7	11.6
Condition	9.0	8.9	10.1	8.7
Carcass wt., lb.	508	494	521	490
Dressing %	60.5	60.5	62.8	62.2
Carcass grades:[b]				
Conformation	11.6	11.2	13.0	12.7
Composite	8.8	8.7	10.1	9.3
Yield	2.01	1.66	1.93	1.73
Marbling[c]	6.5	6.4	8.6	7.2
Kidney fat %[c]	1.75	1.61	1.68	1.33
Ribeye area, sq. in.	9.8	10.1	10.9	10.3
Ribeye area/100 lb. carcass	1.95	2.05	2.09	2.12
Shear 1" core	24.16	21.92	20.04	22.19
Fat thickness, mm[d]	8.6	8.0	9.6	7.9
Fat thickness, in.[d]	0.34	0.31	0.38	0.31
Carcass wt./day of age	1.20	1.19	1.13	1.09

[a]Weight at end of test.
[b]Avg. standard = 7; avg. good = 10; avg. choice = 13.
[c]Estimated by grader.
[d]Measured at one place on ribeye tracing.

NORTH CAROLINA STATE UNIVERSITY
Agricultural Experiment Station
Raleigh, North Carolina

I. PROJECT: Animal Science 1010

Direct and correlated response to selection for weaning weight and postweaning gain

II. OBJECTIVES:

(1) To measure the effectiveness of selection to increase 205-day weight and postweaning gain to 365 days and to evaluate correlated responses in other traits.

(2) To investigate phenotypic and genetic relationships between growth and milk production.

III. PERSONNEL:

E. U. Dillard, O. W. Robison, T. N. Blumer and B. H. Johnson

IV. ACCOMPLISHMENTS DURING THE YEAR:

Ninety-three calves were weaned at Raleigh and ninety-two at Plymouth. Average 205-day weights were up somewhat at Plymouth, but down at Raleigh. New pasture seedings failed at Raleigh in the Fall of '73 and there were few acres of pasture available with any clover in the sward. The continued production of relatively light calves raises serious questions regarding the effectiveness of a selection project for gain. Estimated milk yields of cows at Raleigh were also substantially lower than those for cows at Plymouth where the pasture mixture contained very good clover stands in almost all pastures. Seventy-four bulls were slaughtered at the end of their postweaning gain test and meat evaluation data collected. In addition, the testes of all bulls slaughtered were recovered and studied for factors that might be related to reproductive potential. Analysis of data for two years on these reproductive traits for 138 bulls indicated relatively high correlations (0.38-0.48) between several measures of reproductive potential and weaning weight when compared to those between the same traits and gain on postweaning test (0.07-0.21). These findings suggest that early growth may be quite important in determining later reproductive performance. Heritability for testes weight was 1.06, for weight of right epididymus, 0.23; for sperm in right testis, 0.30; and for daily sperm production, 0.30.

V. FUTURE PLANS:

This experiment will be continued according to plan.

VI. PUBLICATIONS:

Johnson, B. H., O. W. Robison and E. U. Dillard. 1974. Body growth and testicular development in yearling Hereford bulls. J. Anim. Sci. 39:213. (Abstract).

VII. COOPERATING AGENCIES:

N. C. Department of Agriculture

CLEMSON UNIVERSITY
Agricultural Experiment Station
Clemson, South Carolina

I. PROJECT: SC00102

Title: Genotypic and phenotypic response of crossbred cattle under different levels of management

II. OBJECTIVES:

1. To evaluate the reproductive and lifetime performance of crossbred females under different environmental conditions.

2. To develop genotype: environmental systems for optimum beef production in the Southeastern United States.

III. PERSONNEL:

C. E. Thompson, J. R. Hill, Jr., S. G. Woods, G. C. Skelley and L. R. Allen

IV. ACCOMPLISHMENTS DURING THE YEAR:

During the March 15-June 15 breeding season, 477 Angus females were mated to semen from 5 sire breeds (Angus, Charolais, Polled Hereford, Holstein and Simmental) at 3 locations including the Simpson Station, Clemson, S. C. Edisto Experiment Station, Blackville, S. C. and Coast Experiment Station, Summerville, S. C. Females from these matings (30 of each genotype) will be assembled post weaning at the Edisto Experiment Station in the fall of 1975 to form the first replicate of this study.

V. FUTURE PLANS:

The matings to Holstein and Angus sires will be deleted from the 1975 matings in order to increase the number of each of three crossbred genotypes (Polled Hereford-Angus, Charolais-Angus and Simmental-Angus). The Holstein-Angus and straight Angus calves from year 1 will be utilized in another study.

VI. PUBLICATIONS:

None

VII. COOPERATORS:

Department of Animal Science, Clemson, S. C.
Edisto Experiment Station, Blackville, S. C.
Coast Experiment Station, Summerville, S. C.
Department of Agronomy, Clemson, S. C.

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Production, Inventory and Performance Data, S-10 Herds - 1974

State South Carolina

Location	Clemson				
Breed of sire	Simmental	P. Hereford	Charolais	Holstein	Angus
Breed of dam	Angus	Angus	Angus	Angus	Angus
Line or group[1]	Purebred	Purebred	Purebred	Purebred	Purebred
Percent used in project	100	100	100	100	100
Inventory as of December 31, 1974: Cows 2 years and over	25	16	15	24	90
Inventory as of December 31, 1974: Yearling heifers	13				3
Inventory as of December 31, 1974: Bulls and steers under 1 year					
Inventory as of December 31, 1974: Heifers under 1 year					
Inventory as of December 31, 1974: Bulls over 1 year	0	3	1	1	2
Inventory as of December 31, 1974: Steers over 1 year					
Repro. perf.: Percent pregnant[2]					
Repro. perf.: Calf survival percent[3]					
Wean. perf.: Adj. ADG[4]					
Wean. perf.: Ave. type sc.[5]					
Postweaning performance: No. of bulls					
Postweaning performance: No. of heifers					
Postweaning performance: No. of steers					
Slaughtered: No. of bulls					
Slaughtered: No. of heifers					
Slaughtered: No. of steers					
Remarks					

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system indicate if different.

S-10-1 (Rev.)

Production, Inventory and Performance Data, S-10 Herds - 1974

State South Carolina

Location		Coast				
Breed of sire		P. Hereford	Charolais			
Breed of dam		Angus	Angus			
Line or group[1]		Grade	Grade			
Percent used in project		100	100			
Inventory as of December 31, 1974	Cows 2 years and over	58	58			
	Yearling heifers	12				
	Bulls and steers under 1 year					
	Heifers under 1 year					
	Bulls over 1 year	4	3			
	Steers over 1 year					
Repro. perf.	Percent pregnant[2]					
	Calf survival percent[3]					
Wean. perf.	Adj. ADG[4]					
	Ave. type sc.[5]					
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments.

[5]Suggest S-10 scoring system indicate if different.

UNIVERSITY OF TENNESSEE
Agricultural Experiment Station
Knoxville, Tennessee

I. PROJECT: H-306 (S-10)

Effects of selection to improve growth rate in beef cattle

II. OBJECTIVES:

1. To measure the effectiveness of selection to improve growth rate to a year of age and the effects such selection will have on other traits.

2. To investigate phenotypic and genetic relationship between growth rate and other variables.

3. To investigate various methods of improving the accuracy of assessment of growth rate.

4. To study inbred beef cattle with the aid of immunogenetic markers.

III. PERSONNEL:

R. R. Shrode, T. B. Turner, Donald D. Howard, Robert D. Freeland and W. T. Butts, Jr.

IV. ACCOMPLISHMENTS DURING THE YEAR:

Collection of data on weights and body measurements at pre-weaning (4 months), weaning (7 months) and post-weaning (yearling) stages was continued as described in the original project procedures.

A study of generation intervals since the beginning of the present breeding program(1968) in the project herds was conducted. Average generation intervals in months have been reduced from 52.9±2.6 to 37.9 ±1.0 in the Hereford herd and from 64.5±1.7 to 45.6±1.1 in the Angus herd. The longer interval in the Angus herd is the result of using two-year-old bulls in the herd while in the Hereford herd only yearling bulls have been used for several years.

An analysis of six years' performance data from the Angus herd to assess the effect of interaction between sire and sex of calf was conducted. The results indicate this interaction to be non-significant in the case of most traits at all three growth stages when traits were observed. This interaction was of negligible magnitude even in the case of a few traits for which it was statistically significant, and it appears likely that the

significance was a chance result of a few sires having small numbers of total offspring and exhibiting sex ratios greatly different from 1 ♂: 1 ♀. Apparently real sex differences with respect to magnitude of variance components, especially variance among paternal half sibs, exist, making for some large sex differences in heritability estimates.

V. FUTURE PLANS:

Assessment of results of selection to date, with attention being given means, variances, heritabilities and genetic and phenotypic correlations of all recorded variables in both selection and control herds will be undertaken. Effort will be made to collaborate in this with other stations conducting projects involving use of control herds.

VI. PUBLICATIONS DURING THE YEAR:

Morrow, R. E. 1974. Age, frequency and season of weighing and reproduction as factors influencing growth curve parameters in Angus cows. Ph.D Dissertation, University of Tennessee, Knoxville.

Shrode, R. R. and T. B. Turner. 1974. Reduction of generation interval in beef herds. J. Anim. Sci. 39:150. (Abstr.).

Production, Inventory and Performance Data, S-10 Herds - 1974

State Tennessee

Location		PES	PES	PES	TES	TES
Breed of sire		Angus	Angus	Angus	Hereford	Hereford
Breed of dam		Angus	Angus	Angus	Hereford	Hereford
Line or group[1]		1	5	6	1	2
Percent used in project		100%	100%	100%	100%	100%
Inventory as of December 31, 1974	Cows 2 years and over	60	60	60	60	60
	Yearling heifers	10	11	5	11	7
	Bulls and steers under 1 year	27	21	26	21	24
	Heifers under 1 year	23	17	23	32	28
	Bulls over 1 year	6	6	6	0	0
	Steers over 1 year	0	0	0	0	0
Repro. perf.	Percent pregnant[2]	93.3	90.0	100.0	91.7	98.3
	Calf survival percent[3]	87.5	96.3	81.7	96.4	88.2
Wean. perf.	Adj. ADG[4]	1.78	2.04	2.03	1.49	1.51
	Ave. type sc.[5]	13.1	13.5	13.8	13.0	13.2
Postweaning performance	No. of bulls	14	22	35	27	23
	No. of heifers	22	26	14	21	22
	No. of steers	0	0	0	0	0
Slaughtered	No. of bulls	0	0	0	0	0
	No. of heifers	0	0	0	0	0
	No. of steers	0	0	0	0	0

Remarks: PES; 1=Inbred,; 5=Select; 6=Control. TES; 1=Select; 2=Control

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation/percent of Pregnancy percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments: Age of dam, Sex

[5]Suggest S-10 scoring system: indicate if different.

TEXAS A&M UNIVERSITY
Agricultural Experiment Station
College Station, Texas

I. PROJECT: H-1936

Evaluation of hybrid systems for total efficiency of beef production.

II. OBJECTIVES:

1. Evaluation of hybrid vigor for traits of major economic value.
   a. Female traits (breeding cattle)
      (1) Growth and maintenance requirements evaluated under pasture and drylot conditions
      (2) Annual lifetime fertility, including age at puberty, services to conception and calving intervals
      (3) Incidence of dystocia
      (4) Productive longevity
      (5) Maternal ability, milk yield
   b. Male traits (slaughter cattle)
      (1) Rate and efficiency of growth prior to optimal slaughter weight
      (2) Survivability and vigor
      (3) Carcass merit

2. Comparison of breeds and crosses, including dairy breeds, for their potential as "dam lines" for beef production. Dam-line breeds and crosses among these breeds will be Hereford (H), Angus (A), Brahman (B), Jersey (J) and Holstein Friesian (F).

3. Characterization of "sire" breeds, including Charolais, Brown Swiss, Santa Gertrudis, Chianina, Limousin and Simmental, for their beef production potential and particularly for their specific complementarity with the hybrid "dam" lines.

4. Evaluation of differential performance levels among reciprocal breed crosses resulting from:
   a. Differential maternal effects of purebred dam lines
   b. Differential sex-linked effects associated with purebred sire or dam lines.

5. Evaluation of loss in hybrid vigor associated with the decreased heterozygosity and recombination losses due to <u>inter se</u> matings of F_1 hybrids, as practiced in new breed development.

6. Production of experimental cattle with the required degree of controlled genetic variability for efficacious auxiliary intensive investigations:
   a. Evaluation of growth curves of body composition using serial slaughter techniques
   b. Evaluation of partial efficiencies of growth, maintenance and lactation
   c. Development of management systems specifically applicable to optimal utilization of sire and dam line breeding programs: for example, nutritional programs to reduce dystocia and to promote early postparturient conception

III. PERSONNEL:

C. R. Long (leader), R. C. Thomas and T. C. Cartwright

IV. ACCOMPLISHMENTS DURING THE YEAR:

Growth rates to a year of age and yearling weights and heights were analyzed for bulls and heifers of the Angus, Brahman, Hereford, Holstein and Jersey breeds and for the ten crossbred genotypes (reciprocals pooled). Heterosis estimates were 7% for average daily weight gain, 9% for 365-day weight, and 2% for 365-day height. No heterosis was observed for gain in height. Brahmans and Holsteins were taller while Angus and Holsteins were heavier than other straightbreds. Considerable variation in body shape was observed. Analyses of serial slaughter data revealed significant effects of age and genotype on slaughter characters and carcass composition. Results of puberty studies indicated crossbred bulls to be larger and younger than straightbred bulls at puberty.

V. FUTURE PLANS:

Project H-1936 will continue as outlined in the proposal. Serial slaughter of F_1 bulls will provide growth and body composition information up to 36 months of age.

Females on pasture and in individual pens will produce two calf crops of second generation animals (F_2's from F_1's and second generation straightbreds from straightbreds). Types of data collected on the second generation will be similar to that collected on the first generation. Subsequent calf crops from females in the first generation will be sired by "terminal sire" types. Examination of alternative sire breeds and evaluation of maternal ability to raise growthy calves will be two areas of interest.

VI. PUBLICATIONS DURING THE YEAR:

Jenkins, T. G., C. R. Long, G. E. Joandet and T. C. Cartwright. 1974. Composition of bulls of a five-breed diallel. J. Anim. Sci. 39:146. (Abstract).

Joandet, G. E., H. A. Fitzhugh, Jr., T. C. Cartwright and J. B. Bidart. 1974. Effects of sire breed on pre- and post-weaning growth. J. Anim. Sci. 39:234. (Abstract).

Joandet, G. E., H. A. Fitzhugh, Jr., T. C. Cartwright and J. B. Bidart. 1974. Effects of sire breed on dystocia and post natal survival. J. Anim. Sci. 37:235. (Abstract).

Long, C. R., R. C. Thomas, T. C. Cartwright and H. A. Fitzhugh, Jr. 1974. Growth of bulls of a five-breed diallel. J. Anim. Sci. 39:146. (Abstract).

Long, C. R., R. C. Thomas, T. C. Cartwright and H. A. Fitzhugh, Jr. 1974. Growth of heifers of a five-breed diallel. J. Anim. Sci. 39:147. (Abstract).

Thomas, R. C., T. C. Cartwright and C. R. Long. 1974. Age and size at puberty of bulls of a five-breed diallel. J. Anim. Sci. 39:151. (Abstract).

I. PROJECT: H-2101

Breeding methods for beef cattle in the southern region

II. OBJECTIVES:

To estimate genetic parameters and genetic-environmental interactions of biological and economic traits.

III. PERSONNEL:

T. C. Cartwright (leader), C. R. Long and R. C. Thomas

IV. ACCOMPLISHMENTS DURING THE YEAR:

Analysis of relationships among body weights, absolute growth rate, absolute maturing rate, relative growth rate and degree of maturity showed that selection for absolute growth rate increased weight at all ages while selection for relative growth rate would increase weights up to 530 days but decrease weights thereafter including mature weight. Heterosis for degree of maturity was relatively small at birth and maturity and highest from 12 to 18 months.

A simulation model for beef production was developed for reproduction, herd structure, and nutrition components. This model is operational and is designed to interface dynamically with forage production and economic-marketing components. Simulated reproduction levels for different sizes of breed and nutritional levels varied widely and validated closely with research observations.

Productivity of Angus-Jersey cows bred to Charolais bulls (AJ) was compared with Hereford (H). The average AJ weaned a calf 65% of her weight; the average H weaned a calf 40% of her weight. The AJ produced 1 kg calf on 17% less feed for cow and calf up to weaning than the H; this advantage lowered to 6% at yearling age.

V. FUTURE PLANS:

To compare and refine the simulation model, validate it with research data, and add a forage and economic component in cooperation with the U. S. Meat Animal Research Center. Various alternative production systems will be chosen to emphasize the most logical production changes required to accommodate drastic changes in the feed: cattle price ratio. Also production methods emphasizing shifting forage utilization from herd maintenance to sale weight production will be examined.

VI. PUBLICATIONS DURING THE YEAR:

Carpenter, J. A., Jr., H. A. Fitzhugh, Jr., T. C. Cartwright and R. C. Thomas. 1973. Relationships between calf performance and mature size of beef cows. J. Anim. Sci. 37:231. (Abstract).

Ellison, D. R. 1974. Productivity of F_1 Angus-Jersey cows compared with Hereford cows under intensive and extensive management conditions. M. S. Thesis, Texas A&M Univ., College Station, Texas.

Ellison, D. R., T. C. Cartwright, R. C. Thomas and H. A.Fitzhugh, Jr. 1974. Productivity of Angus-Jersey vs. Hereford cows. J. Anim. Sci. 39:144. (Abstract).

Fitzhugh, H. A., Jr., M. C. Miquel and R. C. Thomas. 1973. Canonical analysis of beef cow weight and productivity. J. Anim. Sci. 37:233. (Abstract).

Sanders, J. O. 1974. A model of reproductive performance in the bovine female. M. S. Thesis, Texas A&M Univ., College Station, Texas.

Sanders,J. O., G. E. Joandet and T. C. Cartwright. 1974. Simulation of female bovine fertility. J. Anim. Sci. 39:149. (Abstract).

Smith, G. M., H. A. Fitzhugh, Jr., L. V. Cundiff, T. C. Cartwright and K. E. Gregory. 1974. Genetic analysis of maturing pattern in cattle. J. Anim. Sci. 39:150. (Abstract).

Smith, G. M., H. A. Fitzhugh, Jr., L. V. Cundiff, T. C. Cartwright and K. E. Gregory. 1974. Heterosis for maturing patterns in cattle. J. Anim. Sci. 39:150. (Abstract).

I. PROJECT: H-1938

Breeding methods for beef cattle in the southern region

II. OBJECTIVES:

To determine antigenic structure and enzymatic content of bovine spermatozoa.

III. PERSONNEL:

Jerry Caldwell (leader) and D. F. Weseli

IV. ACCOMPLISHMENTS DURING THE YEAR:

Effort has been toward developing antibodies against histocompatability antigens on the surface of leucocytes and spermatozoa. Antibodies against leucocyte antigens have been produced in polymorphic antiserum. Techniques are being studied to isolate specific antigens in order to illicit monospecific antibody response.

V. FUTURE PLANS:

Continue the work to develop the techniques to isolate specific antigens and study the separation of X & Y chromosome bearing sperm cells.

VI. PUBLICATIONS:

One planned.

I. PROJECT: 1646

Qualitative genetic differences in cattle and pleiotrophic effects

II. PERSONNEL:

Nat M. Kieffer and T. C. Cartwright

III. ACCOMPLISHMENTS DURING THE YEAR:

A chromosome translocation involving centric fusion of chromosomes numbers 1 and 29 was discovered during the investigation of short-term leucocyte cultures from a crossbred bull calf. The calf was sired by a purebred Angus bull and was out of a cow largely of Charolais breeding which was subsequently found to also carry the translocated chromosome. The diploid number of chromosomes in both animals was 59 instead of the normal 60. A similar chromosomal translocation was reported in the Swedish Red and White breed (SRB) by Gustavsson and Rockborn in 1964 and more recently in Charolais cattle by English workers. Both the cow and calf reported here were morphologically normal in all points of conformation. Both centromeres of the translocated chromosomes appeared to be present and thus the karyotypes of these translocation heterozygotes were completely balanced. However, one would expect 50% of the gametes produced by a translocation heterozygote to be inviable. Swedish data tend to support this conclusion since daughters of translocation sires returned to service more often than daughters of normal sires. This was apparently due to an increased rate of embryonic death.

IV. PUBLICATIONS DURING THE YEAR:

Swatland, H. J. and Nat M. Kieffer. 1974. Fetal development of the double muscled condition in cattle. J. Anim. Sci. 38:752.

West, R. L. 1974. Red to white fibers ratios as an index of double muscling in beef cattle. J. Anim. Sci. 38:1165.

Production, Inventory and Performance Data, S-10 Herds - 1974

State Texas

Location		McGregor, Texas			
Breed of sire	Angus	Brahman	Hereford	Holstein	Jersey
Breed of dam	Angus	Brahman	Hereford	Holstein	Jersey
Line or group[1]					
Percent used in project	100	100	100	100	100
Inventory as of December 31, 1974: Cows 2 years and over					
Yearling heifers	27	26	54	30	17
Bulls and steers under 1 year					
Heifers under 1 year					
Bulls over 1 year	2	12	9	2	3
Steers over 1 year					
Repro. perf.: Percent pregnant[2]					
Calf survival percent[3]					
Wean. perf.: Adj. ADG[4]					
Ave. type sc.[5]					
Postweaning performance: No. of bulls					
No. of heifers					
No. of steers					
Slaughtered: No. of bulls					
No. of heifers					
No. of steers					
Remarks					

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments

[5]Suggest S-10 scoring system indicate if different.

Production, Inventory and Performance Data, S-10 Herds - 1974

State Texas

Location		McGregor,	Texas		
Breed of sire	Angus	Angus	Angus	Angus	Brahman
Breed of dam	Brahman	Hereford	Holstein	Jersey	Hereford
Line or group[1]					
Percent used in project	100	100	100	100	100
Inventory as of December 31, 1974: Cows 2 years and over					
Inventory as of December 31, 1974: Yearling heifers	32	25	33	29	37
Inventory as of December 31, 1974: Bulls and steers under 1 year					
Inventory as of December 31, 1974: Heifers under 1 year					
Inventory as of December 31, 1974: Bulls over 1 year	6	3	4	2	3
Inventory as of December 31, 1974: Steers over 1 year					
Repro. perf.: Percent pregnant[2]					
Repro. perf.: Calf survival percent[3]					
Mean. perf.: Adj. ADG[4]					
Mean. perf.: Ave. type sc.[5]					
Postweaning performance: No. of bulls					
Postweaning performance: No. of heifers					
Postweaning performance: No. of steers					
Slaughtered: No. of bulls					
Slaughtered: No. of heifers					
Slaughtered: No. of steers					

Remarks

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments

[5]Suggest S-10 scoring system indicate if different.

S-10-1 (Rev.)

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Production, Inventory and Performance Data, S-10 Herds - 1974

State Texas

Location		McGregor,	Texas		
Breed of sire	Brahman	Brahman	Hereford	Hereford	Holstein
Breed of dam	Holstein	Jersey	Holstein	Jersey	Jersey
Line or group[1]					
Percent used in project					
Inventory as of December 31, 1974: Cows 2 years and over					
Inventory as of December 31, 1974: Yearling heifers	26	31	34	47	27
Inventory as of December 31, 1974: Bulls and steers under 1 year					
Inventory as of December 31, 1974: Heifers under 1 year					
Inventory as of December 31, 1974: Bulls over 1 year	2	4	2	3	1
Inventory as of December 31, 1974: Steers over 1 year					
Repro. perf.: Percent pregnant[2]					
Repro. perf.: Calf survival percent[3]					
Wean. perf.: Adj. ADG[4]					
Wean. perf.: Ave. type sc.[5]					
Postweaning performance: No. of bulls					
Postweaning performance: No. of heifers					
Postweaning performance: No. of steers					
Slaughtered: No. of bulls					
Slaughtered: No. of heifers					
Slaughtered: No. of steers					
Remarks					

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments:

[5]Suggest S-10 scoring system; indicate if different.

S-10-1 (Rev.)

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY
Agricultural Experiment Station
Blacksburg, Virginia

I. PROJECT: 206100 (S-10)

Heterosis from crosses among British breeds of beef cattle.

II. OBJECTIVES:

To measure heterosis obtained from crosses among the Angus, Hereford, and Shorthorn breeds, as shown by fertility and livability, growth rate, fattening ability and carcass quality.

To compare straightbred cows with crossbred cows on the basis of lifetime production.

III. PERSONNEL:

M. B. Wise, F. S. McClaugherty, J. S. Copenhaver, J. P. Fontenot, R. C. Carter, W. H. McClure, J. A. Gaines

IV. ACCOMPLISHMENTS DURING THE YEAR:

A. The objective of the phase of the experiment to be reported here is to compare straightbred calves with three-breed cross calves out of two-breed cross dams. This is a continuation of previously reported results from crossing the Angus, Hereford and Shorthorn breeds, and it is preliminary to results comparing straight-breeding with rotational crossbreeding.

In 1960, the cow herd originally consisted of sixty straightbreds (Angus,Hereford and Shorthorn) and sixty crossbreds (reciprocal two-breed crosses) among the three breeds. It has dwindled to 33 straightbreds and 43 crossbreds. The first five calf crops were used to compare straightbred and crossbred cows, and the results have been reported previously. The sixth through twelfth calf crops are included in this report. Results through weaning are complete, as follows: 312 straightbred matings weaned 261 calves (83.7%); 347 crossbred matings weaned 324 calves (93.4%). There are large differences in birth weight, weaning weight, slaughter weight, and carcass weight, all in favor of the crossbreds. Differences in quality, as measured by feeder grade, slaughter grade, and carcass grade are negligible. The increase in total yield at weaning is of the order of 24%. The project has been extended for one year, so one more calf crop will be weaned from these cows, after which a publication will be prepared comparing lifetime production of straightbred versus crossbred cows.

B. Three calf crops in phase three have been weaned, and the project is proceeding according to plan. Results are incomplete at this time, so a summary will not be presented with this writing.

V. FUTURE PLANS

Phase three will proceed according to plan.

VI. PUBLICATIONS DURING THE YEAR:

Gaines, J. A., R. C. Carter and W. H. McClure. July 1974. Heterosis from crosses among British breeds of beef cattle. Va. Poly. Inst. and State Univ. Res. Div. Report 158.

Gaines, J. A., C. Hill, W. H. McClure and R. C. Carter. Heterosis from crosses among British breeds of beef cattle: straightbred versus crossbred cows, I. J. Anim. Sci.: accepted but not published to date.

Gaines, J. A., C. Hill, R. C. Carter and W. H. McClure. Heterosis from crosses among British breeds of beef cattle: straightbred versus crossbred cows, II. J. Anim. Sci.: accepted but not published to date.

Production, Inventory and Performance Data, S-10 Herds - 1974

State Virginia

Location		R. B. Dunlap		SVRS		
Breed of sire						
Breed of dam						
Line or group[1]		gr. and cr.		gr. and cr.		
Percent used in project		100		50		
Inventory as of December 31, 1974	Cows 2 years and over	76		120		
	Yearling heifers					
	Bulls and steers under 1 year					
	Heifers under 1 year			47		
	Bulls over 1 year	3		6		
	Steers over 1 year					
Repro. perf.	Percent pregnant[2]					
	Calf survival percent[3]					
Wean. perf.	Adj. ADG[4]					
	Ave. type sc.[5]					
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

[1]Purebreds, grade, line, sire number, crosses, treatment, etc.

[2]Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

[3]Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

[4]Indicate adjustments.

[5]Suggest S-10 scoring system; indicate if different.